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BILATERAL GLIOMA OF THE RETINA WITH NUMEROUS DISTANT METASTASES.

BY DR. JOHN PATERSON GARDINER,

FELLOW IN PATHOLOGY, RUSH MEDICAL COLLEGE IN AFFILIATION WITH THE UNIVERSITY OF CHICAGO.

(*With six figures on Text-Plates VI.–X.*)

AN involvement of the extraorbital structures of the face and head is not a common occurrence with glioma of the eye when this tumor acquires features of malignancy, but it is observed with much greater frequency than secondary tumors in more distant portions of the body. The regional invasion or metastasis by direct continuity is usually manifested as growths into the bones adjacent to the orbital cavity, by extension backward into and along the optic nerve to the meninges and brain, or outward upon the face, and as growths in the lymph glands about the parotid gland, sometimes invading that organ as well.

In the cases of glioma collected by Wintersteiner[1] in 1897 and numbering 497, there was involvement of the adjacent lymph glands in 46, the brain and meninges in 43, the cranium and bones of the face in 40, and the parotid gland in 9; the three cases in which the spinal meninges and cord were the seat of secondary tumors should no doubt also be considered as examples

[1] *Das Neuroepithelioma Retinæ*, Wien, 1897.

of regional invasion. The metastatic growths due to embolism of tumor cells were on the other hand fewer: in the skeletal bones in 9 cases, in the liver in 7, in two instances in the ovary and kidney, and in the lungs and spleen in one case each. I have been able to find but four additional observations of secondary growths of this nature since Wintersteiner's report.

That of Fehr[1] concerns a four-and-one-half-year child with the history of a change noticed in the left eye a few weeks previous to the examination which resulted in a tentative diagnosis of glioma, confirmed by a few days' observation of the rapidly growing tumor. Recurrence of the growth was apparent a few weeks after removal of the eye and contents of the orbit, as a soft spongy tumor which gradually attained a great size. Death took place three months after the operation. The post-mortem examination showed an involvement of the periosteum of the left superior maxilla and of the pericranium and internal surface of the calvarium in several places. In the periosteum of the ribs on the right side and underneath the pleura were dark red, flat tumor masses readily seen through the pleura. Similarly located tumor nodules occurred on the left side and between the left lung and pericardium, which were adherent also in the anterior mediastinum, in the periosteum on the inner surface of the sternum, and in the mediastinal lymph glands. In the liver were a number of white, soft tumors dotted with hemorrhages; some of them were as large as walnuts, and where they extended to the surface they were markedly umbilicated. Tumors were also present in the inguinal lymph glands on one side.

In the case observed by Radcliffe and Goldberg[2] the distant tumors were in the liver. The child, when eight months of age, fell so as to bruise the face, and when one and one-half years of age the temple was struck on an

[1] *Centralblatt für praktische Augenheilkunde*, 1900, xxiv., 129.

[2] Archives of Ophth., 1907, xxxvi., p. 223.

iron knob in a similar accident. About a month after this last injury the mother noticed a peculiar amber tint in the left eye which subsequently became white, with swelling and inflammation in both eyes; about this time the infant had pertussis and rubeola. The left eye finally developed some exophthalmos and was removed together with the orbital tissues. Death followed a few months later. An examination showed a soft, pultaceous mass on the base of the brain, and fine, round, well separated grayish-white tumors in the liver, which were examined by Dr. B. M. Randolph and were pronounced to be metastatic tumors.

Lauber[1] has reported the appearance two months after the enucleation of a gliomatous eye in a one-and-one-half-year old child, of a rapidly growing tumor on the cranium which softened and became ulcerated. A recurrent growth was also present in the orbital cavity, and at the post-mortem examination secondary growths were found in the lungs. A white reflex had been noticed in the eye soon after birth.

The fourth of these cases is the recently published account by Wintersteiner.[2] In the right eye of a two-months-old child with upper and lower ciliary staphyloma existent from birth, the cornea was found opaque, with a brownish mass of blood pigment behind it. No perception for light could be determined in this eye, and following a diagnosis of fœtal healed uveitis the eye was enucleated. Six months later a rapidly growing tumor apparent in the cavity was diagnosed as a recurrent glioma. This tumor attained monstrous dimensions before the death, four months later (ten months after the operation). It extended from the top of the head to the chin, and secondary tumors appeared in the opposite temple, the right humerus, and bones of the lower extremities. A post-mortem examination was conducted

[1] *Klinische Monatsblätter für Augenheilkunde*, 1907, xlv., 270.
[2] *Ibid.*, xlv., 271.

and the histologic study of the metastatic tumors in the various bones including the cranium resulted in finding simply round-celled structures resembling small round-celled sarcomas. In the enucleated eye, however, imperfectly developed "rosettes" were present; the tumor had so grown into the ciliary body as to make it scarcely recognizable and there was no trace of retina or iris found. Marked hemorrhages both old and recent were apparent in the lower portion of the eye and the lens was dislocated upward in the staphyloma; no growth of the tumor into the nerve was made out. Wintersteiner's report is entitled *Neuroepithelioma Retinæ* (Kryptoglioma).[1]

The glioma of the retina to be reported occurred in a child, four years of age, with the following clinical history:

When the infant was a few months old the parents noticed a peculiar yellow reflex in the right eye. At the age of three and one-half years the eye was enucleated after the diagnosis of glioma had been made, and three months after this the child was admitted to the Illinois Charitable Eye and Ear Infirmary to the service of Dr. Beard. Examination at this time disclosed a recurrent growth in the right orbit and a growth diagnosed as glioma in the remaining left eye; these were both removed and X-ray treatment instituted. Following a brief period of improvement, death took place seven months after admission to the Infirmary.

Postmortem examination.—The body is 108*cm* long, of slender skeletal structure, slight musculature, and very meagre in fat. The skin is pale and posterior lividity is present. There is a greenish discoloration of the abdomen, and a bedsore in the sacral region, 20*cm* in diameter. Rigor mortis is not marked. The face is disfigured by two growths; the larger on the right side, including the orbit, is the size of half a large grape fruit. (Fig. 1.) Having an outward projection of 5*cm*, its lateral diameter extends from the middle

[1] The thesis by Dahs, *Ueber ein Glioma Retinæ mit massenhaften Metastasen*, Griefswald, 1906, has not yet been received by the Surgeons-General Library, Washington, D. C. Therefore I am unable to state the extent of the metastatic growths in this instance.

ILLUSTRATING DR. GARDINER'S ARTICLE ON "BILATERAL GLIOMA OF THE RETINA WITH NUMEROUS DISTANT METASTASES."

FIG. 1.—Photograph of the head showing the recurrent growths in both eyes. The scalp has been removed, showing the metastatic involvement of the pericranium.

of the nose to within 1*cm* of the right ear; its vertical, from 1.5*cm* within the margin of the hair to the upper border of the alveolar process of the lower maxilla. In front of the ear it is continuous with enlargements in the neck. The right angle of the mouth is pushed downward. The swelling is moderately soft, like the tip of the nose, but immovable. The skin is freely movable, save for an area 12*cm* laterally and 6*cm* vertically which includes the margin of the orbit and an ulcerated region, the size of a quarter, over the malar bone, above which there are several smaller ulcers. The skin immediately adjacent is smooth, tense, œdematous, and there is a bluish-white, mottled appearance throughout the ulcerated area. The eyeball is simulated by a growth protruding 5*cm*, having a dark bluish discoloration over its middle third. The eyelids have ulcerated away, causing a furrow which surrounds the protruding mass; it is deepest at the external canthus. Around the orbit several small, rounded, light-gray prominences are seen, two or three being as large as the half of a cherry. The recurring growth in the left orbit, the size of a large English walnut, has protruded and forced the eyelids outward and apart for a distance of 2.5*cm*. The membrane covering the growth is lustreless and opaque, and here and there bluish discolorations can be seen beneath it. Occupying the right half of the growth there is a swelling the size of a pecan nut, extending from the upper portion of the internal canthus to the middle of the lower lid. The membrane covering this has ulcerated, leaving a moist, greenish-gray surface. The two enlargements, one on either side of the face, are connected by a swelling over the glabella, which extends upward over the lower half of the vertical portion of the frontal bone. Above the left zygomatic arch, in the region of the pterion, is a tumor the size of a goose egg, flattened somewhat and extending upward under the hair 6*cm*. The skin is movable and the tumor firm to the touch. On the right side is a similar tumor, a trifle smaller and situated a little more posteriorly. Over the scalp several growths are palpable. (Figs. 1 and 2.) Three prominent ones are easily isolated; they are raised from 1.5 to 2*cm* above the surface of the calvarium, flattened and equal in diameter. One begins just above the middle of the forehead and passes

backwards, stopping just in front of the bregma; it is widest in its lateral diameter, which measured 12*cm.* There is one in the region of either parietal eminence, the left more prominent than the right. They meet in the centre, and their posterior portions gradually disappear as they approach the superior curved line of the occipital bone. Over their posterior surfaces irregular nodules can be felt, the largest being the size of a Lima bean. The scalp is freely movable, however; the growths are firm and closely adherent to the calvarium.

The measurements of the skull indicate quite definitely its remarkable alteration in shape. Passing vertically from one external auditory meatus to the other, the distance is 38*cm.*[1] The horizontal circumference at the level of the external occipital protuberance and the frontal eminences is 35*cm.*[2] From the glabella along the sagittal suture to the external occipital protuberance is 36*cm.*[3]

On removing the scalp, which comes away easily, the growths are seen situated beneath the pericranium. They cover the calvarium, except for a small area around the bregma, especially on its left, and larger areas above the outer portion of either superior curved line of the occipital bone. The enlargements present a mottled appearance, consisting of red and whitish-gray areas of various sizes.

On removing the calvarium, the dura is attached to its internal surface but is readily separated. (Figs. 3 and 4.) The internal surfaces of the parietal bone are covered with a soft, grayish-red, villous layer 1*cm* in the thickest portion. Other areas similarly involved are the upper half of the frontal and occipital bones, especially the left side of the latter. The sutures are loosened, crepitus is readily obtained, and there is a grayish-red, soft tissue which bulges out from the inner surface of the sutures of the calvarium, the coronal and sagittal being mostly involved. There is a correspondence

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[1] At one year of age the average is 26 centimetres, from seven to twelve years, 30 to 31 centimetres. *Anatomische, physiologische und physikalische Daten und Tabellen*, Dr. Herman Vierordt, Jena, 1906, p. 616.

[2] At ten years of age, 49 centimetres. Vierordt, *l. c.*

[3] In the adult, 33 centimetres. Vierordt, *l. c.*

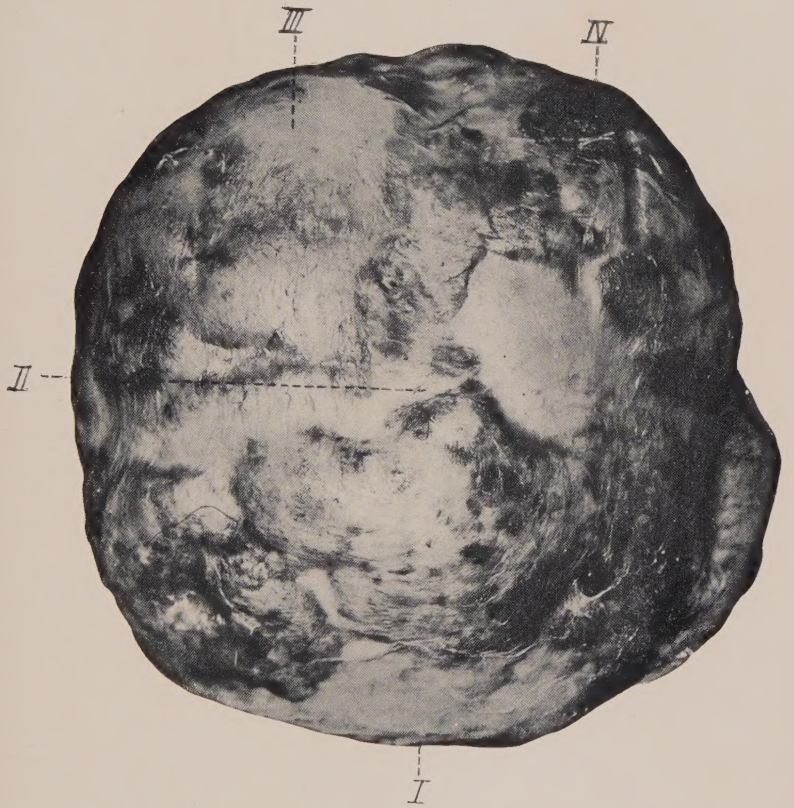

FIG. 2.—Calvarium ; the scalp has been removed.

I. Glabella.
II. Bregma.
III. Right parietal eminence.
IV. Left parietal eminence.

between the location of the growths on the outer and inner surfaces, and where they are most marked on the outer they are likewise most prominent on the inner surface. At no place in the skull-cap is there a complete deficiency in bone.

Section of the face and head, made for convenient study, shows an involvement on the right side of all the structures, limited only by the dura above and the hard palate below. The right orbital cavity is filled by two apparently separate growths, the anterior, the smaller, is the size of a bantam egg. This growth, dark gray in color, is almost wholly outside of the orbit; its external portion has been described as the mass protruding between the eroded eyelids; its posterior portion enters the inner half of the orbit for the distance of 1*cm*. The remainder of the orbit is filled with a yellowish-gray, fibrous-like growth, which left the orbit through the spheno-maxillary fissure, along the course of the optic nerve, and through the sphenoidal fissure into the middle fossa of the skull, presenting there a growth the size of a pecan nut, which is attached to the dura, but does not penetrate it. The lateral bodies of the ethmoid, lachrymal, and turbinated bones are changed into a light, yellowish-gray, soft mass which occludes the posterior half of the anterior and all of the posterior nares and the antrum of Highmore 1*cm* to the left. The medulla of the cribriform plate of the ethmoid is dark brown in color and the ethmoidal and palatal air cells are filled with a brownish-yellow growth. The air cells in the body of the sphenoid are obliterated and the medulla is composed of a light-yellow centre surrounded by a brown rim. All of the bones entering into the formation of the orbit are affected, in that the periosteum is swollen, soft, and of a mottled, whitish-red color. This involvement extends even out of the orbit over the external surfaces of the superior maxillary, malar, frontal, and nasal bones, so that the skin covering this region is pushed out 5*cm* by a grayish white mass, which is firmly attached to the periosteum. The bones entering into the formation of the spheno-maxillary fossa are also involved, and as a result the spheno-maxillary fossa is obliterated, and the growth protrudes out under the zygomatic fossa below the ear. The left orbital cavity is filled with a solid, grayish-white mass. Anteriorly there

is a dark-gray centre 1.5*cm* in diameter, with a yellowish-white border. Posteriorly, it is yellowish white and striated; it passes out of the orbit with the optic nerve and through the spheno-maxillary fissure. Only the bones entering into the roof of the orbit are affected. Closely adherent to the orbital surface of the orbital plate of the frontal bone is a grayish mass 5*cm* in its thickest portion. This mass passes out of the orbit over the supraorbital ridge, and loses itself in the swelling, already referred to, which connects the two eyes. Near the centre of the cerebral surface of the orbital plate of the frontal bone, and extending toward the juncture of the greater wing of the sphenoid, is a reddish-brown region covered by villous tumor growths. The adjacent surface of the dura is similarly affected; however, the cerebral surface is smooth. In the anterior portion of the left middle cerebral fossa, just below the anterior lacerated foramen penetrating the dura, is a nodulated, dark-gray, soft mass, the size of a Lima bean, attached firmly to the bone; there is absence of bone between the spheno-maxillary fossa and the growth. The lymph glands of the neck, the tracheo-bronchial, the supra- and infra-clavicular lymph glands are involved, some reaching 4 to 5*cm* in diameter. On section they are light gray in color, studded throughout with many hemorrhagic regions. Nodules are seen in either pleural cavity, firmly attached to the periosteum of the ribs, under the parietal pleura. They present a dark-bluish appearance, but on section are white with many hemorrhagic spots. The periosteum of the vertebræ is likewise affected. The growths are seen in the spinal canal, infiltrating but not penetrating the dura, nor as far as examined are any of the spinal nerves affected. The right testicle is enlarged and harder than normal. Cross-section reveals many whitish-gray nodules, the largest 5*mm* in diameter, and a number of bloody regions which give the cut section a mottled appearance. The left testicle is normal in size and also contains several nodules similar to those of the right. The os ilei presents enlargements both on the internal and external surfaces, so that the right iliac bone at its centre is 6*cm* thick and the left 5*cm*. (Fig. 5.) The growths have attacked the periosteum; on section they show a gray-white color, with darker areas here and there. The

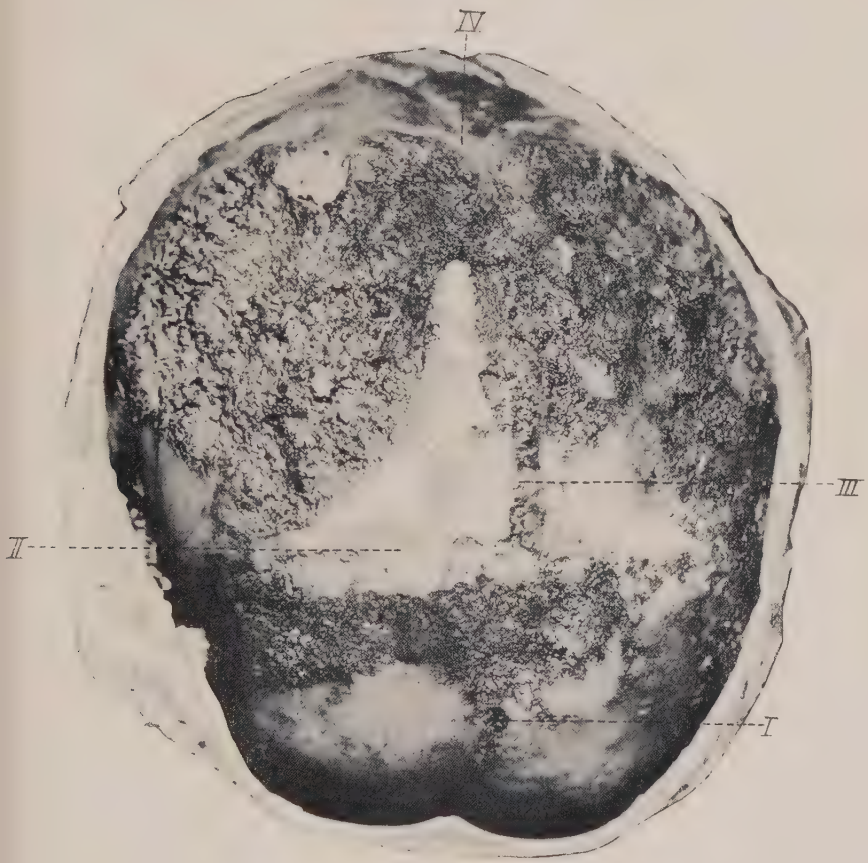

FIG. 3.—Inner surface of calvarium, showing involvement of inner surface and of the sutures.

I. Frontal suture.
II. Coronal suture.
III. Sagittal suture.
IV. Lambdoid suture.

central portions of the internal surfaces of the bones making up the coccyx, show soft, grayish, nodulated enlargements 2.5*cm* long and 1.5*cm* wide. On the inner surface of both bodies of the pubes are enlargements: the right, a trifle larger, is 2.5*cm* in diameter, dark gray across its middle portion, and white at either end; it extends downward and outward well along the obturator foramen; the left is white throughout. The bodies of either ischia are enlarged, especially the external surface of the left, where there is a firm, white enlargement the size of an English walnut, which extends well forward and upward, almost covering the obturator membrane. The enlargement on the internal surface of the right ischium is yellowish-gray, flattened, and extends onto the obturator foramen; it there meets the growth from the internal surface of the body of the pubes. Both cotyloid foramina are normal except that the acetabular fossæ are discolored, dark gray, and continue so out under the cotyloid ligaments. The ligamenta teres are not affected. The long bones of the leg are affected symmetrically; the femur at its upper extremity externally is dark-brownish red for a variable distance down the shaft. This discoloration is most marked on the anterior surface, where it extends downwards 6*cm*, and posteriorly, between the lesser and greater trochanters, 5*cm*. The periosteum over this region and about the neck is slightly swollen and spongy, presenting a red and white mottled appearance, except the digital fossa, the head, and trochanters which are normal. Longitudinal section shows in the medulla several yellowish-gray and brownish-red regions; in every instance they are well attached to the bone, limiting the medullary cavity of the shaft. The epiphyses are free, as also is the interior of the trochanters. The lower end of the shaft of the femur is similarly affected, though not as markedly externally. On the posterior surface of the manubrium is present a firm though compressible nodulated mass, the size of a hickory-nut. There are pea-sized to hazel-nut-sized nodules here and there on either side of the sternum, situated beneath the costo-chondral cartilages. They are located as follows: between the first and second on the left side and third and fourth on either side, fourth and fifth on the right side, fifth and sixth on the right side, 3*cm* from

the sternum; on the right side between the seventh and xiphoid cartilage.

Sections were taken for microscopic examination from the growths on the sternum, the right temple, the right iliac bone, the dura, in the posterior nares, the lymph glands on the right side of the neck, the medulla and periosteum of the femur, from the recurrent growths in the eyes and that around the left optic nerve, the epidural and testicular tumors.

The eyes were studied in the laboratory of the Infirmary by Dr. E. V. L. Brown of that institution, who has kindly submitted the following report and comment:

The enucleated left eye is of normal size and contour. The cornea is clear, the anterior chamber deep, the iris normal, the pupil 4.5*mm* in diameter and round, though slightly eccentric upward. The lens is clear; back of it one sees a bluish-white angular band of tissue about 6*mm* in length in the horizontal axis and 1*mm* wide vertically; it is surrounded by a whitish-yellow mass of tissue, densely flecked by black and reddish-brown areas; this mass completely fills in the anterior portion of the cavum oculi and presents a concave fore surface exactly corresponding to the form and curve of the posterior surface of the lens with which it seems in immediate contact. There is no evidence of the extrabulbar extension of an intraocular tumor.

On opening the eye a white, soft, pultaceous partly granular mass is found filling the posterior and lateral six-sevenths of the ball. It is directly continuous with the detached retina. A light chocolate-brown mass of hemorrhage separates it from the lens. A circle of pigment on the anterior surface of the lens is evidence of previous adhesion of the iris to the lens.

Stained sections show the cornea and sclera thinned to one-third, some connective-tissue increase in the anterior uvea, marked atrophy from pressure and ectropium uveæ; the conformation of the angle of the anterior chamber is normal. The canal of Schlemm is placed farther back than normally.

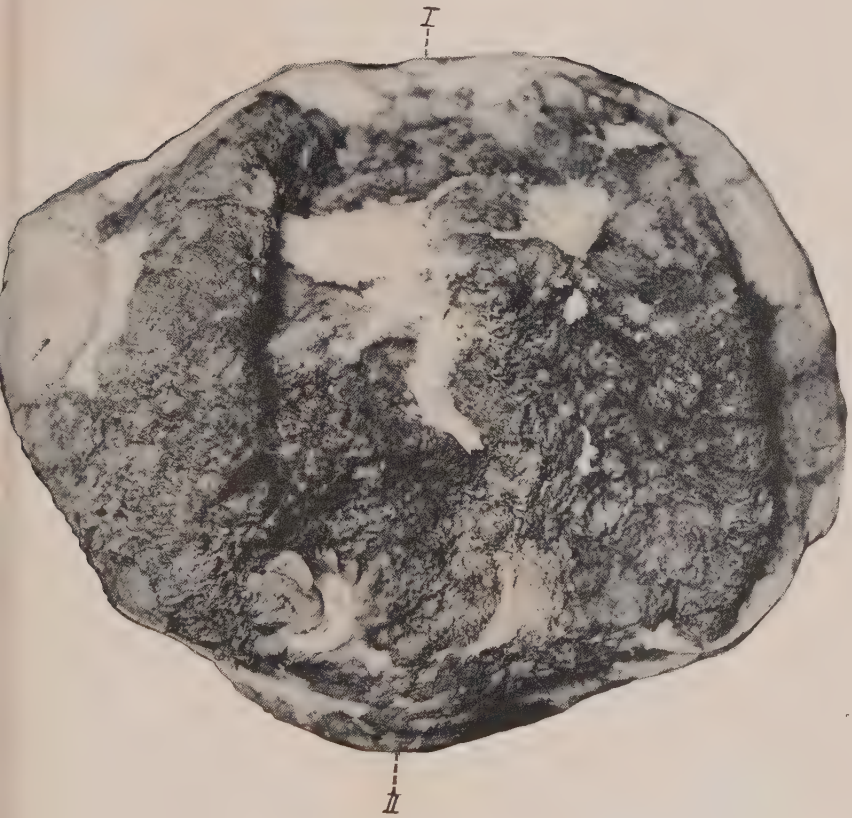

FIG. 4.—Outer surface of the dura.

I. Frontal portion.

II. Occipital portion.

The lens is small and dislocated backward. The choroidea is normal.

The retinal tumor mass detaches this tunic so that its inner surfaces are opposed along the axis of the eye two-thirds of the distance from the papilla to the lens. The tumor has entirely destroyed the retina in its back half, but is directly continuous with its well-preserved layers in the anterior half. Here the tumor shows its farthest extension as a narrow band replacing the two innermost layers in both halves of the retina and as far forward as the posterior surface of the lens. The respective mesial and temporal halves of the thickened tunic diverge toward either side, leaving a triangular space back of the lens filled in with a partly necrotic mass of cells, blood, and pigment. The growth is not markedly vascular. Many areas of calcareous degeneration are found. The tumor is sharply limited at the disk to that portion of the nerve in front of the lamina cribrosa and no other extrabulbar extension can be found.

The cells forming the new growth are of the mononuclear, small, round or slightly elongated type and stain heavily. There is very little cell protoplasm and processes cannot be clearly demonstrated with Mallory's phosphotungstic acid, hæmatoxylin, or other stains. Atypical glioma rosettes are found in great numbers in four-micra-thick serial paraffine sections of the tumor along the retina in the forepart of the eye; a well marked membrane can often be found inside completely closed circles of cells, yet these cells are only apposed to this membrane, their prolongations never extend through the membrane and project free into the lumen in the manner typical for the neuro-epithelial rosette of Flexner and Wintersteiner.

The blood-vessel "cell-mantle" arrangement typical of glioma retinæ is present in all parts of the tumor. The cell palisades nearest the vessel stain the heaviest, and the decrease in staining is uniform outward to the line of demarcation between the cells which are still adequately nourished and the areas of fatty and calcareous degenerated, necrotic cells beyond.

When the section crosses an old retinal vessel strictly at a right angle to its wall, the cells nearest the wall are seen

to be very regularly and uniformly arranged about it; their long axes point toward the centre of the vessel, and their bases are seen to be seated upon and directly apposed to a thin membrane separating them from the vessel wall by a considerable space. (Fig. 6.)

This membrane forms the outer wall of the perivascular lymph spaces finally proven by W. His (*Arch. of Anat. and Phys., Anat. Abt.*, 1880, pp. 224–231), and has become a matter of renewed interest because of the work of Krueckmann, who has recently established its glial nature and renamed it the "membrana limitans gliæ perivascularis." It completely isolates the ectodermal structure of the retina proper from the mesodermal vessel structure. It must be made up of prolongations of cells whose nuclei are somewhere about. Certain it is that the cells immediately surrounding the membrane are very intimately related to it, indeed, at times, an extension of the membrane can plainly be traced outward for two or three cell widths between the cells. I have been unable to trace any cell or process directly into the membrane, but such an arrangement was reported a long time ago by Flexner in ependyma cell glioma of the brain. (*Jour. Nervous and Mental Dis.*, vol. xxv., No. 5, pp. 306–309, May, 1898.)

A similar perivascular limiting glial membrane derived from and connected with the retina and its internal limiting membrane has also been described by Wolfrum (*Arch. f. Ophth.*, lxv., 2, pp. 220–263, Fig. 6, Feb., 1908) as surrounding the embryonal vessels of the vitreous (Wolfrum considers, as do practically all other recent investigators, that the vitreous proper is ectodermal in origin).

This retinal vessel membrane, therefore, acquires a new significance in that it makes one more ectodermal structure in the retina from which glioma may originate. In this connection it is interesting to note a statement by Hatai ("On the Mesoblastic Origin of the Neuroglial Tissue"—*Illinois Medical Journal*, vol. iv., 1902–1903, p. 640): "I therefore conclude at the present moment that the nuclei, which migrate from the capillary wall into the central nervous system, are one source of the neuroglial tissue." A limitans gliæ perivascularis, however, does not account for the vessel

FIG. 5.—Pelvis (reduced ⅓).

I. Left anterior superior iliac spine.
II. Left half of symphysis pubis.
III. Right half of symphysis pubis.
IV. Section through right iliac bone, showing extensive growths involving the periosteum on the inner and outer surfaces.
V. Portion removed for microscopic study.

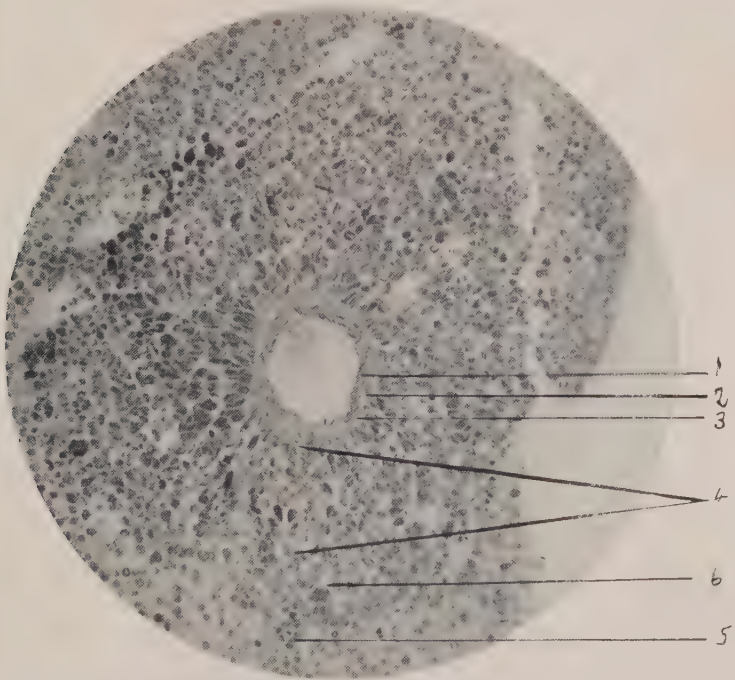

FIG. 6.—Vessel and cell mantle (typical of glioma retinæ).

1. Vessel. 2. Perivascular lymph space of His bounded by 3, membrana limitans gliæ perivascularis. 4. Deep staining cell mantle. 5. Faint staining necrotic zone. 6. Atypical glioma rosette.

formation in retinal glioma, as might be hastily concluded because the perivascular space which it limits is absent about the new developed capillaries, although these show the "cylinder" or cell-mantle formation; and, too, cylinders are found in metastases in the choroidea when these are voluminous, and in orbital nodes where no glial membranes surround the vessels. The fact that the zone of cells about the vessels is sharply demarcated from the adjacent necrotic mass is due to the better nutrition of the cells nearest old vessels, and the fact, too, that the new vessels, with cylinders of cells about them grow into necrotic areas. The extensive necrosis and resulting characteristic vessel tubule formation always found in intraocular glioma is all out of proportion to that found in glioma in the brain, orbit, etc.

The enucleated right eye shows a glioma retinæ with extrabulbar extension along the optic nerve, typical intraocular vessel arrangement and atypical rosettes; the extrabulbar node shows a diffuse round-cell proliferation simulating round-cell sarcoma without the special vessel arrangement of glioma. The main tumor presents no features of interest not discussed in the description of the other eye.

In all the sections examined from the growths outside of the eye, the tumor proper consists of minute round cells sparsely endowed with cytoplasm, with nuclei varying considerably in size, but quite generally equal to or smaller than the nuclei of lymphocytes. The nuclei of these tumor cells stain intensely and remind one by the absence of karyokinetic figures that we are still somewhat in the dark as to the methods by which multiplication of cells takes place in sarcomas of the round-cell type. The chromatin in these nuclei is abundant and in many cells fairly uniformly distributed as minute rounded masses throughout the nuclei. In many other cells, however, the nuclei have the chromatin in such irregular masses that the appearances strongly suggest pyknosis. Against such an explanation are many

facts, such as the abundance of vessels and the absence of other evidences of retrogressive processes; in fact the appearances are of such a nature that they might be explained as due to some as yet poorly understood process of nuclear (and cell) division, instead of beginning death and pyknosis. In only a few sections is there any arrangement of these cells constituting what may be referred to as the structure of the tumor, or presenting any analogy with the structure of the primary tumor. In some sections of the epidural masses, of other periosteal nodules and in sections of the extension along the pharyngeal submucous tissue a fairly regular distribution of the cells into masses approximately equidistant from the blood-vessels between them is present. This arrangement or grouping may be likened to the lobules of the human liver in the regularity of size and separation by blood-vessels; the masses of tumor cells are much smaller than liver lobules. A comparison of this structure in these metastatic growths with the sections by Dr. Brown from the primary tumor of the eye show at once a close duplication in numbers and distribution of blood-vessels and the corresponding relation to aggregations of tumor cells. In these secondary growths there is, however, none of the palisade arrangement (Fig. 6) about the vessels—the so-called perivascular "cell-mantles"; in other words the malignancy of the process as it is illustrated by structure, is marked by an absence in nearly all the secondary tumors of any structure resembling that of the primary tumor; in a few places there is a distinct although slight similarity. This more complete deviation from the structure of the primary tumor met with in nearly all the sections examined of the regional and more distant metastatic growths is characterized by wide blood-vessels, regions of hemorrhage, unequal numbers of capillaries as regards distribution, larger and smaller masses of tumor cells, and often appearances suggesting the rapid growth into normal tissue.

This absence of orderly growth, and the appearances caused by it, present in nearly all the secondary tumors, is such as might be met with in round-cell sarcomas originating almost anywhere in the body.

THE TREATMENT OF IMMATURE CATARACT.[1]

By Major HENRY SMITH,

INDIAN MEDICAL SERVICE, CIVIL SURGEON OF JULLUNDER, PUNJAB, INDIA.

IMMATURE cataract is generally recognized as unsuitable for the capsulotomy operation while in the immature condition, and I think justly so. By that operation it is impossible to get all the lens matter detached from the capsule, the result of which is, that if operated upon by that method a considerable amount of lens matter is left behind. This swells up and becomes opaque, and is exceedingly likely to give rise to a severe form of iritis which will probably bind down the iris to the capsule and which with the capsule and its cell proliferation will form a very dense after-cataract.

For the treatment of such an after-cataract, a mere needling operation is not sufficient. To efficiently treat such an after-cataract, it is necessary to extract it. If the iris is extensively bound down to it, it is necessary at the time of the extraction to mechanically detach the iris from the after-cataract with an instrument and then to proceed with the extraction.

Such an after-cataract could be couched if not adherent to the iris, but couching would in my opinion be certain to be followed by the degenerative condition of the retina which invariably follows couching of the catarac-

[1] Read by invitation at the Meeting of the American Ophthalmological Society, New London, July, 1908.

tous lens—retinitis pigmentosa sine pigmento—though not with so much rapidity of progress. I have seen the results of the work done by the immemorial lens coucher in the Punjab, and have examined the cases carefully. This form of degeneration is invariable in their most favorable results. The larger the nucleus of the lens couched, the more rapid its progress, as the nucleus and capsule are apparently never absorbed, whereas the soft matter within the couched capsule is absorbed.

It will thus be seen why few are willing to undertake the treatment of the after-cataract which follows the extraction of the immature lens by the capsulotomy method with a light heart. The following case in my observation is a typical example of the complication which practically always follows the extraction of the immature lens by the capsulotomy method.

A. B., immature cataract in both eyes, was the principal of an extensive business firm. His visual incapacity involved large monetary issues to himself and others, so he was willing to accept any risk. In the autumn of 1906, an iridectomy was performed with the object of maturing the cataract by one of the most experienced operators by the capsulotomy method in the world. The result was *nil.* There was no more progress in the maturing of the cataract in that eye than in the other eye, which was equally advanced. A few months after the iridectomy he had the immature cataract extracted by the capsulotomy method by the same operator. Five months after the extraction I saw him for the first time. The condition then was as follows:—His eye was, and had been bandaged ever since the operation and he was suffering considerable pain. He was using atropin drops. On examination there was marked evidence of an active iridocyclitis; the perception of light was very good; the after-cataract was very dense; the margin of the iris was bound to it all around. The operator and another consultant of the same school informed him that they regarded the operation as a failure, and that nothing further could be done.

The pressing claims of patients, with cataracts slowly

maturing by nature's process, often keeping the patient almost blind for years before the case would be suitable for operation by the capsulotomy method, rendered it imperative that some means should be tried for their relief; hence the various procedures adopted for the maturing of immature cataract. The procedures adopted for this purpose are:

1. Puncturing the lens capsule with a needle.
2. Iridectomy (simple).
3. Iridectomy with massage through the cornea.
4. Iridectomy with direct massage with some form of instrument.

1. Puncturing the lens capsule is liable to be a complete failure to establish a traumatic cataract. A traumatic cataract thus established may constitute a serious ophthalmic emergency. The formation of the traumatic cataract may be so rapid and the lens may swell up to such a degree as to cause acute glaucoma and the lens matter may escape into the aqueous chamber and cause acute iritis or iridocyclitis.

The extraction of such a traumatic cataract admits of no delay. The conditions under which it has to be extracted are highly unfavorable and difficult and the results are far from being as satisfactory as in the extraction of a cataract matured by nature's process. It will thus be seen that when this procedure is efficient in maturing a cataractous lens, that is, when it causes a traumatic cataract, it is fraught with serious trouble and serious danger, and is now, I think, relegated to the operations of the past.

2. Iridectomy in my opinion has no influence whatever on the maturing process.

3. Iridectomy with massage through the cornea I have done extensively. In my observation it has no influence on the maturing of immature cataract, if the massage be done with a justifiable degree of pressure—that is pressure which will not dislocate the lens. It is

only an experienced operator who knows the amount of pressure justifiable. If any excess of pressure be used, the operator is very liable to dislocate the immature lens in an eye from which the aqueous humor has been released by an iridectomy. Under these circumstances the immature lens is often very easily dislocated, so that, in my opinion, if this procedure be adopted within safe limits, both the surgeon and the patient are almost certain to be disappointed.

4. Iridectomy with direct massage of the lens with an instrument. This procedure was adopted on account of the failure of simple iridectomy and of iridectomy with massage through the cornea, the simpler methods. This is a daring and most unsafe procedure. Only those familiar with the extraction of the immature lens in the capsule can fully realize how delicate the capsule in these cases is, and how easily it can be lacerated by the application of the bluntest and smoothest of instruments, in the hands of men most highly trained in ophthalmic manipulation, and also how easily the lens can be dislocated in these cases by such direct manipulation. If neither of these undesirable accidents occurs I cannot see how direct massage can be more effective than massage through the cornea. If either of these accidents does occur, the operator is in the awkward position of being obliged to extract the immature lens without delay, the best way he can.

It will thus be seen that ripening procedures are either dangerous or disappointing, and that the surgeon would be better advised to either wait on nature's ripening process, or to extract immature cataract in the capsule.

While I condemn these ripening procedures, I fully appreciate the demand which has caused their initiation, the demand for some procedure by which men of active mental and bodily habits could be relieved of their condition without remaining practically blind for the years through which nature's process would run, before

they could be operated on by the capsulotomy method. The demand is pressing; delay may mean want to the family whose bread-winner is the subject; it may mean, when the subject has waited for his cataract to mature by nature's process, that his business has passed into other hands, and that, at his time of life, he is badly fitted to begin a career *de novo*. It may mean that the community has lost a number of years of the services of one of its most important members. In any case the delay occasioned by waiting for the completion of nature's ripening process involves mental depression, the degree of which can be best appreciated by those of extensive experience in the treatment of cataract, but hardly less so by the general practitioner whose patient the subject is—mental depression allied to that incident to the prospects of confinement in a dark cell without labor, a form of judicial punishment admissible in no civilized country. We come across patients who insist on a definite opinion, be it good or bad, and who will not be shelved. I have known such men, when told that they had immature cataract and that they would have to wait for a year or two before it could be operated on, to suffer from mental depression consequent thereon which was little short of what would follow a death sentence. The surgeon who intends to wait on nature's process of maturing should be very careful to avoid informing patients that they have immature cataract until he cannot help it, and then he should not lead them to believe that they have long to wait for it to mature. This may seem to be humbugging the patient but it is not, it is saving him as much as possible of the mental strain to which he would otherwise be subject. The surgeon can save his own reputation by informing some member of the family of the real state of affairs.

It will thus be seen that:

1. Extraction of immature cataract by the capsulotomy method is hardly justifiable.

2. Ripening procedures are either unsatisfactory or dangerous.

3. To wait for nature's maturing process is highly unsatisfactory and detrimental to the patient.

The treatment of immature cataract, which I practise extensively, of which I am an ardent advocate, which I regard as the procedure of the future, which will leave mature senile cataract a much rarer condition than it is at present, is extraction of the lens in its capsule, a procedure to which immature cataract is admirably suited. In fact even the normal lens can be extracted in the capsule as easily as the ripe one by those skilled in the art.

I have extracted the normal lens in its capsule in a number of cases like the following. A patient has mature senile cataract in one eye—I extract it. He has a large leucoma in the other eye to which the margin of the iris is adherent all round. It is thus impossible to see his lens. His perception of light is good and the eye is otherwise normal. I assume, and generally correctly, that the lens of this second eye is also cataractous. I make the incision for extraction of the cataract, perform a large iridectomy, and extract the lens in its capsule. On several occasions I have been mistaken in supposing it to be cataractous, and have found that it proved to be absolutely normal when extracted. Such cases are very common in India, the result of trachoma, and such patients see remarkably well through a small portion of clear cornea.

The stage of immaturity at which I advocate the extraction of immature cataract in the capsule is the stage at which it unfits its possessor for the performance of his ordinary duties. I hold that if for no other reason than for the treatment of immature cataract, every ophthalmic surgeon should be familiar with the art of extracting the cataractous lens in its capsule. The time allotted does not admit of my going over this opera-

tion in full detail. I have a monograph in the press on the treatment of cataract, in which I go into full detail on everything concerning extraction in the capsule among other things; but here I wish to state concisely a few of the leading points in this operation.

The patient and his eye are prepared as for the ordinary operation; atropin is not necessary on account of the exceeding infrequency of iritis following this operation. The operator sits on a stool at the patient's head and the assistant stands beside the operator. The assistant is thus not in the way of the operator. The sclero-corneal incision is made with the speculum in and includes a little less than half the circumference of the sclero-cornea. I personally prefer the incision finished in the cornea without a conjunctival flap, as the flap is more or less in the way. An iridectomy may or may not be done according to the operator's fancy. The speculum is now removed, the assistant draws down the lower eyelid with the face of his thumb, placed on the skin below it. With his other hand he lifts the upper eyelid forward with a large-sized strabismus hook in his first three fingers, as if he were lifting the contents of the orbit out of the socket, and not lifting it towards the brow, using the ring and little finger of the same hand to draw back the brow and orbicularis muscle. This does not imply any violence on the part of the assistant.

The operator now places the end of a large-sized ophthalmic spatula on the left side of the cornea over the junction of the middle and lower third of the lens. He places the end of a large-sized blunt-pointed strabismus hook over the corresponding position to the right of the spatula. He makes steady pressure backwards towards the optic nerve with this spatula and he makes similar pressure with the strabismus hook except that in making pressure with his strabismus hook he draws it backwards and forwards across the cornea. The edge of the lens at the wound will be seen to tilt forwards and the clear

vitreous will be seen between it and the scleral margin of the wound. As soon as this occurs, the pressure with the spatula should practically cease and the same stroking movement of the strabismus hook should be continued, its position not being altered on the cornea at first but the direction of the pressure exerted through it should be altered gradually more and more in the direction of the wound until it finally folds the cornea beneath the lens. At this stage the lens is delivered. The iris should be replaced if prolapsed. The assistant should then let go the eyelids, and the patient's eye should be dressed up. I may here state that my experience now extends to about 20,000 cataract extractions, about 17,000 of which have been in the capsule, and amongst the latter have been many immature cataracts, especially in recent years.

A CASE EXHIBITING A SYMBLEPHARON, CORNEAL OPACITIES, AND A PROBABLY FIBRO-FATTY TUMOR OF THE CONJUNCTIVA, ALL OF PRENATAL ORIGIN, IN A WOMAN WITH HEREDITARY CATARACTS AT AN EARLY AGE.[1]

By Dr. BURTON CHANCE, Philadelphia.

Mrs. E. M., aged fifty-two, consulted me in March, 1907, for the removal of "cataracts." Two years before this I removed soft cataracts from the eyes of her daughter, aged twenty-four. The lady's mother had had bad sight from early years, which E. M. in her childhood had been told was caused by cataracts. The history of her mother's mother is uncertain, yet it is believed that she too had cataracts. The lady herself was healthy and robust, except for imperfect eyesight which in the previous three years had failed so much that she was able to tell the movement of the hand at only a foot or two. She never had had inflamed eyes, neither had they ever been injured; but she had had "birthmarks" on them: there was a story of prenatal impression connected with their origin. The description of these "birthmarks" is the object of this communication.

The external appearance of the eyelids was healthy and their actions normal, but, projecting from below into the fissure of the right eye was a pearly, unpigmented, vascular mass which approximately measured 6 by 4*mm.* On withdrawing the lower lid, the tumor was seen to be adherent to the globe; it appeared to spring from the retrotarsal fold, and, advancing across the limbus, its base blended with the

[1] Read before the American Ophthalmological Society, July 15, 1908.

cornea about *2mm* beyond the limbus in the lower and outer eighth. The point of union was defined by a dense white line. The tumor projected beyond the plane of the lids, though it could not readily be seen when the lids were tightly closed. It was irregular in outline and nodular in form; the outer portion was cyst-like. The surface was smooth and conjunctival in appearance, and it was soft and easily palpable on its firm base in the sclera. I regarded it as a fibro-fatty tumor. On raising the upper lid the retrotarsal fold was seen to be bridged across by a broad symblepharon, as wide as the tarsus, and attached to the cornea *3mm* within the limbus. This singular formation was adherent to the globe. It was striated, moderately vascular, smooth on the surface, soft, and pliant. Where it was attached to the cornea there was a very dense white line, and, beyond this, like a shadow, was a fainter line. The attachment melted into the substance of the cornea and beyond into the sclera, so that a fine probe could not be insinuated beneath the borders. The tarsal cartilage was present in the upper lid. The movements of the lids and globe were not impeded by the malformations present.

Beneath the epithelial layer of the cornea was a densely opaque white line, which extended obliquely across it from about *2mm* above the horizontal meridian, well within the limbus, downwards to beyond the vertical, where it ended in a hook, projecting upwards and inwards. The width of the line was almost uniformly *1mm.* The remaining portions of the cornea were clear and the entire exposed surface sparkling. The cornea was not undersized.

In the upper outer quadrant of the cornea of the left eye was a broad, dense, pearly white, scleral tongue, which extended to about *3mm* within the limbus. This tongue was evenly continuous with the sclera, and, where it ended on the cornea there was the same sort of line and shadow as was noticed demarcating the abnormal structures in the right eye. The corneal surface was not appreciably elevated by the projecting tongue, and the remaining portions of the membrane were perfectly clear.

I must regard these opacities and the adhesion of the eyelid to the globe as of inflammatory origin, yet in a most

careful study of the corneas with a strong loup no obliterated nor patulous vessels could be found, and, as the irises were normal in their structure and in their functions, it is all the greater evidence that they were not caused by disturbance in the evolution of the embryologic layers. The patient would not allow me to remove any portion of the abnormal tissues; I can only conjecture as to their histology.

The lenses were dark and densely opaque and about the periphery of each there was a singular festooning of the superficial elements; there were neither stars nor radii. In all fields there was good light-projection.

The left crystalline was extracted by the combined method, without accident; after which the patient was able to recognize the window-bars. The incision was made straight through the scleral tongue. The capsule was dense and very tough. The cataract was of a deep brown color; it was large and had but little cortical.

The healing progressed rapidly. In two weeks the lady came to my office; the eye was then quiet and a hasty trial of the vision gave $\frac{5}{15}$. One week later a thin web of capsule stretching across the nasal half of the coloboma was discinded. On the removal of the Hays knife a good quantity of a rather viscid fluid exuded. For two days the lids remained slightly puffed, and the globe was tinged for several days. After a week the media were seen to be clear and the fundus perfectly healthy; the vision $\frac{5}{5}$. Two months later, with correction, the vision equalled $\frac{5}{5}$, and with + 16 D. + 2. D., ax 90°, her daughter's reading spectacles, she read and sewed with perfect comfort.

CONJUNCTIVITIS ASSOCIATED WITH BACILLUS PYOCYANEUS IN AN ADULT: BACILLUS PYOCYANEUS FOUND IN A NORMAL CONJUNCTIVAL SAC.

By Dr. BROWN PUSEY, Chicago.

IN my routine work during the last year I have found the bacillus pyocyaneus in the conjunctival sac in two cases under conditions which heretofore have not been described; in the one case there was marked conjunctivitis in an adult, in the other there was no conjunctivitis. A look through the literature on the bacteriology of the conjunctiva brings to light the fact that of the cases of conjunctivitis recorded as due to the bacillus pyocyaneus all of them, and there are only five, were in new-born children; also the interesting fact develops that of the many studies of the bacterial content of the normal conjunctiva none has records of the presence of this bacillus—an astonishing fact in view of the frequent presence in the normal conjunctival sac of other common pathogenic bacteria. Because these cases are unique I think them worthy of a brief report.

Case 1 was a man twenty years of age, a student, who said that the eyes had been irritable and red for several months for which conditions he had used an eye-wash nightly. These symptoms became worse about six weeks ago, and about two weeks ago the present conditions set in.

St. Pr. The lids externally and the lid edges are not

involved. The conjunctivæ of both eyes are inflamed, that of the right eye being worse than the left. The conjunctiva of the lids is diffusely swollen and red; that of the transitional folds shows the same condition plus many follicles of unusually large size; these follicles are found especially in the lower folds. The conjunctiva of the eyeball also is much inflamed especially in the lower halves, the redness of the lower halves extending well up to the cornea, attracting attention to the possibility of circumcorneal ulcers, which do not exist. There is hardly any discharge from the eyes—not more than normal—and the patient says that the eyelids have never been stuck together in the morning. Subjectively the eyes cause the patient a good deal of annoyance.

Smears and cultures were made. Smears stained by Gram and counter-stained by saffranine showed many epithelial cells in a fibrinous material, a few polymorphonuclear leucocytes and, after a very diligent search, an occasional Gram-negative bacillus.

The material for cultures was taken from the lower fold of the conjunctiva by rubbing a wire loop over it, and drops of such material were put on Loeffler's blood serum and slanted agar. At the end of twenty-four hours such a slant—and many were made—showed on an average five or six large colonies and three or four small ones. The large colonies proved to be bacillus pyocyaneus, the small ones staphylococcus albus.

A study of the bacillus taken from cultures showed that we were dealing with a non-spore forming Gram-negative small slender organism. Examined in hanging drop it showed a most active motility. Cultures demonstrating the character of the organism were made on various media, as follows: On agar the growth was in large colonies which at first were white, after two or three days the colonies became yellowish green and the medium itself became colored, at first greenish, later a dark blue-green. Gelatine was liquefied. Loeffler's blood serum was liquefied; the unliquefied part of the medium under the growth became greenish, the fluid settling at the bottom of the tube was yellowish. In glucose agar stab culture there was an abundant growth without the formation of gas; after several days the medium had a rich

lemon-green color. Milk was rapidly coagulated with the formation of acid; then it became fluid of a yellowish color. On potato there was an abundant growth of a chocolate brown color. On Heinemann's synthetic "Potato" medium there was an abundant growth, and the medium rapidly became green; apparently the pigment was more abundantly formed and more rapidly diffused throughout this medium than in any other. Bouillon in twenty-four hours became cloudy, had a scum on the top, and assumed a greenish color; this color was richer when the tube was shaken. Chloroform dissolved the pigment formed in bouillon and settling at the bottom had a beautiful bluish green color; the overlying fluid was brownish.

Bouillon culture injected intraperitoneally in a guinea-pig caused death of the animal in less than twenty-four hours. Such a culture in the conjunctival sac of a rabbit caused no reaction.

Case 2, a man twenty-five years of age, consulted me because of headache which the family physician attributed to an error of refraction which existed. In taking the patient's history he stated that occasionally at night the eyes itched and burned. The slight itching and burning were the only indications of involvement of the conjunctivæ, as objectively there was no conjunctivitis. I made routine cultures from both conjunctival sacs; from the left eye bacillus pyocyaneus developed in pure culture; from the right eye a few colonies developed which proved to be staphylococcus and xerosis bacillus. The organism from the left eye corresponded in every particular to that gotten from Case 1 described above. I would repeat that objectively there was no indication of conjunctivitis in this case; subjectively there was slight itching but not more than is frequently complained of in a smoky large city.

The case of conjunctivitis was treated by the use of one-fourth per cent. solution of zinc sulphate applied four or five times daily. Under this treatment the eyes were much improved at the end of a week; at the end of two weeks there were no more organisms present and the symptoms were relieved, the follicles however persisted. Zinc sulphate was also given to the other patient; after three or four weeks the organisms disappeared.

As was mentioned above I found five cases of conjunctivitis recorded in the literature as due to the bacillus pyocyaneus. Two of these cases were reported by von Herff [1] and one each by Derby,[2] Stephenson [3] and Hanke and Tertsch.[4] These cases were all in new-born children.

[1] VON HERFF. Cited by Axenfeld, *Die Bacteriologie in der Augenheilkunde*, Jena, 1907, p. 211.

[2] DERBY, GEO. S. "The Bacillus Pyocyaneus Found in a Case of Conjunctivitis." *American Journal of Ophthalmology*, 1905, xxii., p. 1.

[3] STEPHENSON, SYDNEY. *Ophthalmia Neonatorum*, London, 1907, p. 62.

[4] HANKE and TERTSCH. "Einige seltene Infectionen des Auges." *Klin. Monatsbl. für Augenheilkunde*, 1907, xlv., p. 545.

SOME REMARKS ON THE PRACTICAL VALUE OF THE SPHYGMOMANOMETER TO THE OPHTHALMOLOGIST.

By Dr. JOHN DUNN, Richmond, Virginia.

THE variations from the normal in the pulse tension, whether due to changes in the blood or in the vessel-walls, or due to mechanical interference with the circulation within the brain substance, deserve the consideration of the ophthalmologist. There are certain classes of ocular disease in which the use of the sphygmomanometer should never be neglected, for its revelations are not only helpful in the proper understanding of the existing ocular conditions and suggestive in prognosis and treatment, but will often prevent blunders which without their restraining influence would be committed.

The fascinating questions asked by the sphygmomanometric registerings are not new and have in their proper place received voluminous discussion. With the possible exception, however, of the brain, no part of the human anatomy offers so many practical problems in connection with disturbances of the blood pressure as the human eye.

In the following paper the endeavor has been made to, as briefly as possible, show the practical importance of a more general use of the sphygmomanometer in the routine examinations of many classes of ocular disease. No discussion is made of the different methods and instruments for measuring the pulse tension, and as few

comments made upon the findings of the sphygmomanometer as are deemed consistent with a clear presentation of the cases reported. I have refrained, too, as far as possible, from all theoretical discussion of the effect of continued high general blood pressure on the intraocular structures and from associated questions. The article is intended solely to briefly present the practical aspect of a subject whose importance grows with acquaintance.

Glaucoma. 1. Amanda Brown, fifty-six, negress. *Glaucoma absolute.* Iridectomies due to chronic simple glaucoma failed utterly to stop the progress of the disease, or to check the increasing hardening of the eyeballs. Patient's general health apparently good. Pulse tension 200. Specimens of urine examined negative.

2. Mrs. L., forty-six, *chronic simple glaucoma.* V: O. D. = 16/30. O. S. = 16/15, with correcting glasses. Usual symptoms of chronic simple glaucoma. Pulse tension 170. Urine negative.

3. Mrs. H., aged seventy, *chronic simple glaucoma.* V: O. D. = 16/400. O. S. = 16/30, with correcting glasses. Pulse tension 140; patient a small slender woman; iridectomy checked progress of disease for two years.

4. A. W. F., aged sixty-two. O. D. 16/20, with correcting glass. Fundus shows several small hemorrhages. O. S. *absolute glaucoma.* Urine shows trace of albumen. Pulse tension 200.

5. W. O., aged sixty-three, *acute glaucoma,* O. D., occurring in course of an obstinate small corneal marginal ulceration. Tension suspicious and use of mydriatic refrained from except one instillation of homatropia. Eserine, etc., useless as remedials. Iridectomy made matters worse and enucleation necessary. Pulse tension 220. Chronic nephritis.

No case of essential glaucoma, acute or chronic, can to-day be considered as fully examined until the patient's pulse tension has been measured by the sphygmomanometer and the information thus obtained has been given

due consideration. In every case of essential glaucoma, except those hereditary ones occurring in early youth, which I have examined since the use of the sphygmomanometer has been a part of the routine examination of such cases, the pulse tension was above normal and in the severer cases, both acute and chronic, very much above normal. This observation seems in accord with the most widely received teachings as to the cause of glaucoma. Let us briefly see the practical and suggestive value of knowing the patient's pulse tension. In Case 1 the patient was a small woman with double simple glaucoma, moderately well advanced, when the eyes were iridectomized. With a pulse tension of 200, even though no kidney changes could be demonstrated, the prognosis for checking the disease was extremely bad, and, in fact, the glaucoma progressed rapidly to the absolute stage. As far as I have been able to observe, as a general rule, it may be said that in simple chronic glaucoma, at any given stage, the chances of retaining, by iridectomy, even though it be successful from a surgical standpoint, for a reasonable length of time the vision present, varies with the pulse tension, being better the nearer the pulse tension approaches the normal. Where the pulse tension is very high, the prognosis *quoad visum* is very bad.

The same rule applies in cases of acute glaucoma, where, as in Case 5, utter failure of the iridectomy might have been foretold. In Case 3, although the patient was seventy years of age, iridectomy checked the progress of glaucoma for two years. Here the pulse tension was only 140 (120 being normal). In examining a case of glaucoma after the ocular conditions have been noted, the pulse tension should be taken and then the urine examined. High pulse-tension may coexist with kidney changes so extensive that gross alterations in the composition of the urine are easily discoverable. Again, it is compatible with the secretion of urine in which

there may be found by the usual methods of urinalysis little or nothing of diagnostic pathological importance. Operative procedures undertaken for the relief of essential glaucoma, acute or chronic, in the presence of a high tension pulse, with demonstrable nephritis, are apt to be wholly failures and may necessitate the removal of the eyeball.

As a general rule, the higher the pulse tension, the less favorable is the glaucomatous eye for surgical procedures. I am well aware of the fact that the pulse tension is not an accurate index of the condition of the intraocular vascular system and that very high tension can exist for a long time without any symptoms of glaucoma developing. I know, too, that extensive intraocular vascular degeneration may exist in the presence of a relatively low general blood pressure (especially is this true in syphilis). It is also true that in the presence of high general blood pressure the most advanced vascular degeneration may at times be found in vessels of the intraocular system. None of these facts alter the value of the preceding statements relative to operation in the glaucomatous eye; nor do they lessen the desirability of knowing the pulse tension before an iridectomy is done. Again, the higher the pulse tension, the more likely, as a rule, is the use of mydriatics to be followed by the onset of glaucomatous symptoms. From time to time we wish to obtain a better view of the fundus than is to be had through the undilated pupil, but the patient's age and the presence of opacities in the lens and vitreous and the conditions of the sclera under palpation all make us hesitate to artificially dilate the pupil. The pulse tension may decide for or against the use of a mydriatic. Such are some of the practical suggestions which are made by the sphygmomanometer in glaucomatous conditions, and, although these suggestions are of relative value, they are often valuable aids. Lastly, the pulse tension may indicate the

desirability or the undesirability of blood-letting as a remedial measure in attacks of glaucoma.

In the treatment of *corneal ulcerations*, the obstinacy and danger of so many of which are due to the presence of conditions involving changes in the opsonic index or of the adjacent circulation rather than to the nature or location of the micro-organisms present in the ulceration, the findings of the sphygmomanometer force upon our notice the existence of other abnormal conditions than those in the cornea. Take, for example, the case of M. R. L., aged fifty-two, whose left eye showed a suppurative keratitis, the ulceration involving, when I first saw him, the lower third of the cornea, throughout a greater part of its depth. Pulse tension 195; examination showed active stages of chronic nephritis. In M. R. L.'s general appearance there was little to suggest kidney complications, and had not the blood tension been taken I feel sure delay would have occurred in recognizing them and the eye would have been lost. The use of the sphygmomanometer is an additional safeguard against certain omissions which are bound to occur in the life of a busy ophthalmologist. In the treatment of corneal ulcerations, the pulse tension may suggest the cause of the obstinacy and may forbid or admit of the use of atropin salve; may suggest the desirability of an early or repeated paracentesis; may explain why the use of a mydriatic, apparently so urgently called for, produced a complicating attack of glaucoma; or may point to the use of and explain the value of eserine. Illustrative cases are unnecessary.

There are many diversities of opinion as to the proper time for the removal of slowly developing immature *cataract*, and rightly so, for each case should be decided upon its own peculiarities. I suppose all ophthalmologists who have operated before the lens has become fully mature have had successes and all have had failures, the measure of success and failure varying with the case. I

feel sure, other conditions being equal, the case does better the more nearly normal the general blood pressure, and I allow this consideration to weigh heavily in making up my mind whether or not to advise the extraction of a slowly developing senile cataract. Only lately I successfully operated in such a case where the tension of the eyeball was doubtful and where there existed old choroidal changes. The pulse tension in the patient, who was sixty-five years of age, was practically normal, and the absorption of such lenticular debris as I was unable to re-remove progressed satisfactorily. Had the patient's pulse tension been as high as 170 or 180, I should have declined to operate. As a rule, the higher the general blood pressure the greater are the chances that there exist within the intraocular vascular system of old people degenerative changes which will interfere with the absorption of any particles of lenticular cortex left behind. This, of course, applies to mature as well as immature cataracts. As I look back over my work, I can recall cases of cataract where I am sure the sphygmomanometer would have prevented my operating and would have saved me many days made anxious by having to deal with hemorrhage, glaucoma, or secondary iritis the imminence of all of which I had feared and yet I had operated hoping to escape them.

The following two cases of iritis suggest one or two of the practical uses of the sphygmomanometer in this disease.

Case 1. M. A., aged forty-six. Full-blooded. Iritis, O. S.; third attack; onset sudden; congestion intense; pain continuous and almost unendurable. Tension of the eyeball, plus.

Case 2. W. S., aged forty-four, iritis, O. S.; first attack; onset gradual; obstinate. Finally much congestion of ball, with tension slightly raised. Pain at first moderate, then severe.

One of the questions asked in the first case was what would lessen quickly the pain, which was so great that

the patient could scarce control himself. Would the same remedy relieve the lesser, but still severe, pain in Case 2? Internal remedies and the usual external applications failed utterly. In Case 1 the pulse tension was 220 and examination of the urine revealed acute nephritis as a complication. In Case 2 the pulse tension was 120 and no kidney complications could be demonstrated.

In the first case, bleeding from the temple instantly relieved the severity of the pain, which returned, however, after forty-eight hours, when a second abstraction of blood again had the same result; the iritis subsided entirely within a few days, the kidney disease being, of course, treated.

In Case 2 bleeding, as was anticipated, gave very little relief from the pain; the iritis lasted several weeks. It is not the purpose here to discuss further these two cases, but merely to report them as showing the suggestive value of a knowledge of the pulse tension.

Retina. The following three skeleton reports, from which I have purposely omitted all details as to ocular tension, visible changes if any in the ocular media, and appearances of papillar and retinal vessels, serve well to illustrate the value of the information to be derived from the sphygmomanometer.

Case 1. James F., aged fifty-six, apparently well-nourished. O. D. Acute severe iritis in 1907 resulting in occlusion of the pupil. In March, 1898, retinal hemorrhages. Pulse tension 140.

Case 2. M. B., aged sixty-eight, recurrent retinal hemorrhages, O. D. and O. S. Pulse tension 185.

Case 3. Mrs. M. A., full-blooded, aged forty-nine, bilateral, retinal hemorrhages. Pulse tension 220.

In Case 1 the pulse tension suggested the possibility of an infectious arteritis, as the cause of the retinal hemorrhages, and questioning revealed that the patient

had contracted syphilis eighteen months previous to their appearance. The pulse tension was not high enough to suggest such extensive hemorrhages as the result of arterio-sclerotic changes.

In Case 2, however, the patient's age, the appearance of the lenses, both of which were opaque in spots, and of the retinal vessels at once suggested vascular sclerosis as the cause of the hemorrhages, and the pulse tension, 185, served only to confirm this, and especially as the urine was free from both albumen and sugar. In Case 3, the age and appearance of the patient and the picture presented by the fundus, which differed so essentially from the withered appearance present in Case 2, suggested at once a nephritic cause even though there were lacking the gross changes which are seen in the full-fledged forms of albuminuric retinitis. Examination of the urine showed chronic nephritis. The pulse tension was 220.

The association of many cases of spontaneous subconjunctival hemorrhages with vascular sclerotic conditions is so well known that further mention is here unnecessary.

In inflammatory and œdematous conditions visible about the disc head, whether the cause be an intracranial growth, nephritic or infective conditions, the sphygmomanometer often makes valuable suggestions. At times in mixed conditions its repeated findings will allow us to decide which is the predominant factor in the production of the papillary symptoms.

Mrs. M., aged fifty-one, apparently in excellent health. O. D. + 11/8 D^c, 90° = — 1/8^c 180. V = 16/15. O. S. + 3/4 D^c, 90°. V = 16/15–10. Muscular equilibrium normal.

Patient for years had suffered with spells of severe headache which wearing glasses, properly correcting the refractive errors, has failed to prevent or, when present, to relieve. The headaches when at their worst are through the temples and in both parietal and occipital regions. They are often

accompanied by nausea and vomiting, and occasionally by vertigo. Temporary relief can be obtained by any acetanilid preparation, which discovery on her part gradually brought her to the constant use of this drug. At the time of her first visit her bluish lips and finger-nails and nervous manner made it possible to diagnose acetanilid poisoning before learning the history of her case. Urine negative. The patient's pulse tension was 200. With the same sphygmomanometer my own blood pressure was 130.

Mrs. P. N., aged twenty-eight. O. D. and O. S. + 3/4 D^s V = N. Muscular equilibrium normal. Patient suffers according to her account from almost constant, severe, "band-like" headaches. She is unable to use her eyes for any close work, as it seems to increase her trouble. These headaches are not accompanied by nausea, vomiting, or vertigo. Fundus and media normal. Pulse tension 100. Patient has had for years pelvic trouble whose nature she does not know. Internal "remedies," including acetanilid and morphine, have been found useless, even when given to bring temporary relief.

The above two cases are not alike. The relief sought by the patient in neither case can be obtained by mechanical means, such as the adjustment of lenses or muscle-section. In the daily work of the ophthalmologist perhaps no problem suggests itself more frequently than to determine how far in the individual case the correction of refractive and muscular errors will prevent or relieve the headaches from which the patient suffers. Without discussing the above two cases, I wish merely to point out that in the first case the general blood tension is high, in the latter low, and further to state that, as a rule, attacks of migraine, such as occur in the case of Mrs. M., are associated with a pulse tension above normal. This is an important practical point. Increase of the general blood pressure beyond the normal seems to have two main causes: the central and the peripheral. The latter is hematogenous and is the result of collæmia (Haig), however imperfectly determined as yet the precise

chemico-biologic meaning of the term. In collæmia increase in the blood pressure within the arteries is necessary that the circulation may continue. The effects of collæmia upon the metabolic processes are many and variously manifested. Sooner or later, however, it leads to vascular sclerosis and its gross manifestations. Not all collæmic patients suffer from sick headaches. Why this is so, is not the point at issue here. Where migraine does occur it is most often the result of ciliary effort in the presence of intraocular circulatory conditions which exist as the result of collæmia. In other words, the eye-ache in migraine is the result of the efforts of the ciliary muscle to comply with the accommodative demands in the presence of an impeded circulation which often manifests itself as such by an increase in intraocular tension. That this latter condition exists at certain stages of the eye-aches accompanying migraine is beyond question, and under certain conditions these variations in tension are the unrecognized earlier stage of glaucoma. Glasses, which correct the existing refractive errors, lessen the ciliary effort and, in so far, the eye-aches and headaches of collæmic patients, but they do not contribute to the cure of the underlying general pathological conditions which produce them. The practical value, then, of the sphygmomanometer in cases of eye-ache and headache lies in the fact that it helps us to understand why glasses fail to give the full relief sought for and expected of them. It further suggests an explanation of the differences in the results of refractive measurements as obtained in the same eye at different examinations. Beyond and above these minor values, however, the findings of the sphygmomanometer, interpreted aright, give the ophthalmologist a more comprehensive view and thus a better understanding of the problem brought to him by the patient.

Lastly, the ophthalmologist is frequently called upon to interpret and relieve unusual sensations about the

lids and orbital contents which sensations are unaccompanied by visible changes and for which no satisfactory explanation is forthcoming as a result of the examination of the eyes. While I was preparing this paper, I saw the following illustration of what I mean:

Mrs. L. Aged fifty-six, seamstress, an apparently strong healthy woman. For ten days her eyes, which up to that time had never been the source of any unusual discomfort, began to be the centre of burning sensations. These she described as being around the eyeballs, in them, and behind them. There were no visible signs of ocular or conjunctival congestion. To say that these sensations were caused by the absence from her distance and reading glasses of a 1/2 D cylinder, axis 90°, when never before had she had any difficulty in using her eyes for her work, would be to place one's diagnostic ability on a very low plane. Vision normal. Pulse tension 200. Urine showed no albumen. Upon questioning the patient, I found out that for many months she had suffered from a somewhat similar burning of the soles of her feet and palms of her hands—these sensations were so marked as at times to prevent sleep for hours together; that just before the appearance of this burning about the eyes she had had an attack of vertigo and threatened loss of consciousness. The suggestions from findings of the sphygmomanometer in this case were of value diagnostically, prognostically, and therapeutically.

ABSTRACT OF ARTICLES IN VOL. XLVIII., GERMAN EDITION, 1903, NOT PREVIOUSLY TRANSLATED.

By Dr. ALFRED BRAUN, New York.

III.

A CASE OF PIGMENTATION OF THE DISC.

By Dr. H. DYCKMEESTER, Leyden.

Mrs. A. H., forty-nine years of age, came to the clinic, complaining of poor vision. She has dark brown hair. The iris is gray, with a few pigment spots. There is no pigmentation of the sclera. She has a hyperopia of 3 D. With the correcting glass, she has $\frac{20}{20}$ vision in both eyes. The visual field is normal.

The left fundus shows a venous pulse, and a small temporal conus.

The right fundus shows a temporal conus also. Just within this, the disc contains an elliptical area, dark blue in color, with a slight greenish tinge. It occupies about half of the lower outer quadrant of the disc. The centre is somewhat lighter in color than the periphery. There is a small black egg-shaped spot near the upper pole of this area.

Parallactic displacement shows that the area is depressed below the surrounding surface.

From the history and clinical appearance of the case, it is undoubtedly one of congenital pigmentation of the disc.

Many cases of pigmentation of the disc have been reported, following hemorrhage, with or without optic atrophy.

Only six cases of congenital pigmentation of the disc were

published up to 1900. These were reported, respectively, by Liebreich, v. Foerster, Hirschberg, Schleich, Hilbert, and Wiethe.

The author considers the pigmentation to be due to an incomplete retrogression of the excessively developed pigment which occurs in the embryonic optic nerve.

V.

SEVERAL CASES OF CONGENITAL ANOMALY OF THE IRIS.

By Dr. POLTE, Halle.

Case 1.—Mrs. W. J., forty-seven years of age, shows a few slight opacities of both corneæ. The iris is represented by a barely perceptible narrow ring of tissue, at the limbus. The lens is opaque, and displaced upward. The lower border of the lens is plainly visible, and is decidedly nicked, especially in the right eye. The disc can be seen only indistinctly. The choroid shows no coloboma. There is an oscillatory nystagmus. Vision, R, $\frac{2}{35}$ with + 11.0; L, $\frac{2}{35}$ with + 12.0.

Case 2.—P. J., twelve years of age, is the son of the above. He has a bilateral congenital coloboma of the iris, downward and inward. In the right eye, the coloboma is separated from the pupil by a thin brown thread. The coloboma reaches to the ciliary body. The greater part of the iris is light blue in color. Numerous brownish stripes are seen, arranged radially, and somewhat depressed below the surface of the iris. The brown thread which separates the coloboma from the pupil is on the same level as the brownish stripes. In the lower outer part of the iris, is seen a small radially arranged cleft, through which the fundus reflex can be seen. Two small slits are also seen, one on either side of the coloboma and parallel to it. There is posterior cortical cataract. There is no coloboma of the choroid. Vision, $\frac{2}{35}$, not improved by glasses.

In the left eye, the coloboma is separated from the pupil by a broader brownish band of tissue. The coloboma does not reach to the ciliary body. The iris shows the same

coloration as in the right eye. Posterior cortical cataract. Fingers are seen at $1\frac{1}{2}m$.

There is horizontal nystagmus. The pupils do not react to light. When atropin is instilled, the pupils dilate, and in the right eye the coloboma increases in size, while in the left eye it is very much diminished. Under eserin, the pupils are diminished only slightly, and the thin thread in the right eye shows an oscillatory movement.

Case 3.—A. J., ten years of age, is the younger brother of the preceding case. He has a bilateral coloboma of the iris, downward and inward. The lower border of the lens is somewhat flattered. There is a posterior cortical cataract. Oscillatory nystagmus.

There were no other anomalies found in these cases, except a cryptorchidism in Case 3. The two boys were somewhat defective mentally.

Case 4.—C. H., sixty-one years of age, shows a peculiar condition of the iris. At the first glance, it looks as though the patient had very large pupils, but with focal illumination it is seen that a large part of this apparent pupil is composed of dark brown iris tissue, which is in marked contrast to the peripheral portion of the iris, which is bluish green in color. The dividing line between these two portions of the iris is irregular in contour. This dark brown portion of the iris is thinner than the remaining portion, and contains radial striations. The pupillary margin is bluish green, and as thick as the peripheral portion. The pupillary reaction is normal.

Case 5.—W. W., thirteen years of age, shows slight opacities in the left cornea. The iris is normal, except for the lower portion, extending from the pupil to the lower border of the iris, which is thin and atrophic. At the lower outer border of this portion of the iris, there is a hole $1\frac{1}{2}mm$ long, through which the fundus reflex can be gotten. The upper portion of this hole is covered by numerous fine, transverse, brownish fibres. At the lower inner margin of the hole, the iris is thickened, and from this point, numerous fine threads pass through the anterior chamber to the posterior surface of the cornea, to which they are attached.

The pupil is displaced downward. There is rotary nystagmus.

VI.

ON THE USE AND THERAPEUTIC ACTION OF SUBCONJUNCTIVAL SODIUM IODATE INJECTIONS IN EXTERNAL AND INTERNAL EYE DISEASES.

By Dr. A. SCHIELE, Kursk.

The author uses solutions of sodium iodate, of the strength of 1: 5000 to 1: 1000, for subconjunctival injections, in various eye conditions. One half to one syringeful is used at a time. To this is added a drop of a 1% solution of acoin, to render the operation painless. The injection is made as far away from the cornea as possible; usually near the equator. The injections are repeated every three or four days.

The principal effect of the injections seems to be an analgesic one. Pain of iritis, cyclitis, panophthalmitis, etc., often disappears within a few hours after the first injection.

Good effects are obtained in glaucoma, iritis, cyclitis, choroiditis, and infiltrations and ulcerations of the cornea.

In addition to relieving pain, the injections have also a direct curative influence on the morbid process, due to liberation of free iodin in the tissues. They act as a lymphagogue, by causing a vascular dilatation. They act as an antiseptic, both directly, by the presence of free iodin, and also indirectly, by dilating the blood-vessels, and thus increasing the volume of blood which reaches the part in a certain time.

They have also a specific effect upon the syphilitic, rheumatic, or tubercular poison.

IX.

OSSIFICATION AND CALCIFICATION IN THE EYE.

By Dr. K. RUMSCHEWITSCH, Kieff.

The following nine cases were seen by the author:

Case 1.—W. N., twenty-one years of age, a dressmaker, gave a history of suppurative inflammation of both eyes, a few days after birth. Following this, the left eye appeared to be decidedly smaller than the right. The patient had no further trouble until a year ago, when she began to have sharp pain in the left eye. In the last three months, any

attempt at reading or sewing is immediately followed by pain and redness in the left eye, and lachrymation in the right. The left eye is not tender. It is decidedly hard in the equatorial region.

The eye was enucleated on May 28, 1893. Among other changes, the following were noted:

In the anterior part of the choroid, there are large blood-vessels, covered on the inner side by a thin layer of connective tissue, in the middle of which are numerous thin platelets of bone. The edge is very thin, and shows few bone corpuscles. There are no concentric lamellæ or medullary spaces to be seen. Farther back, the bone becomes decidedly thicker, and shows concentric lamellæ, Haversian canals, and medullary spaces. The outer side of the bone is covered by a thick layer of osteoid tissue, which in turn is covered by a layer of large blood-vessels. The inner side of the bone plate is also covered by a layer of osteoid tissue, to which the remains of the retina are attached.

The posterior part of the eyeball is composed mainly of sclera within which lies a narrow funnel, at the apex of which is the optic nerve. The wall of this funnel is composed, from without inward, of a layer of blood-vessels, a layer of osteoid tissue, and a layer of bone.

The lens showed a layer of calcareous deposit, 1*mm* thick, in the anterior cortical and equatorial regions. The posterior cortical region contained a plate of bone, consisting of concentric lamellæ and Haversian canals. The plate contained two cavities, in which remains of lens fibres could be seen. A few isolated calcareous deposits were scattered throughout the vitreous.

Case 2.—N. K., a soldier, twenty-two years of age, had a gonorrhœal conjunctivitis, in March, 1885. On the fourth day of the disease, he had a perforation of the right cornea, followed by atrophy of the eyeball.

On Aug. 10, 1891, he was again seen. At this time, the atrophied eyeball was red and tender. The eye was enucleated, and showed the following changes:

The choroid showed bony change in two places; the first, in its posterior portion, 3*mm* internal to the optic nerve entrance. It was lenticular in shape, 1.5 x 0.5*mm*. The bone

was surrounded by a connective tissue capsule, which contained numerous spindle cells, parallel to the surface of the bone. It was impossible to determine in which layer of the choroid the bony change occurred, as the choroid was atrophied to such a degree that one could not distinguish any layers.

The second nest of bone tissue occurred in the anterior portion of the choroid, at the edge of the orbiculus ciliaris. This plate of bone was flat and measured 2 by 0.5*mm*.

The concentric build was plainly seen in both pieces, but there were no Haversian canals.

In the posterior portion of the vitreous were two round masses of bone, about 1*mm* in diameter.

The anterior half of the vitreous was occupied by two bodies; internally the lens, and externally a large mass of bone.

Case 3.—A. P., a peasant woman, thirty-four years of age, gives a history of a blow with the fist in the right eye, at the age of sixteen, followed by loss of vision. The right eye, which was small, very hard, with an opaque cornea and injection of the bulbar conjunctiva, was enucleated.

In the inner portion of the choroid, there is a thick layer of large vessels, internal to which is a mass of bony tissue. The thickness of the bone varies from 0.1 to 4.0*mm*. It consists of two plates, which show concentric lamellæ and Haversian canals. Between the two plates, are numerous medullary spaces, the smaller of which contain red marrow, and the larger yellow marrow. In the neighborhood of the bone, the choriocapillary layer is lacking, and the vessels enter the bone tissue, not only from the choroid, but also from the retina. The bone is covered on all sides by a thin layer of connective tissue, containing a large number of rows of regularly arranged cells. In some places, rows of osteoblasts are seen. The osteoblasts occur mostly at the points of transition from red to yellow bone-marrow.

In the nasal portion of the eye, the lamina elastica can be seen in places, covering the inner surface of the bone, but in most places, the bone forces its way into the retina. Near the ora serrata, the lamina elastica can be seen on the outer surface of the bone. In some places, it can be seen within

the bone. A few pieces of bone can be seen in front of the ora serrata.

Many of the retinal vessels contain calcareous deposits.

The vitreous contains a mass of bone, a short distance behind the lens.

The lens contains calcareous deposits, arranged between the lens fibres.

Case 4.—M. S., fifty-four years of age, had a cataract extraction, with iridectomy, performed on the right eye. This was followed by inflammatory symptoms and complete loss of vision. A year later, the eye was enucleated, on account of symptoms of irritation in the other eye.

Examination of the eye showed the following:

The region from the ciliary processes to the ora serrata is taken up by a thick vascular membrane, containing numerous pigmented epithelial cells. In the centre of this membrane, is a round bony plate, about 4*mm* in diameter and 1*mm* thick. There are many well developed osteoblasts on its border. The bone is traversed by a blood-vessel, surrounded by reticular tissue, whose spaces contain bone-marrow.

Case 5.—A. N., thirty-five years of age, lost the sight of the left eye, at the age of four, through a purulent keratitis. The eye was quiet until three months ago, when it became red and painful, and it became impossible to read with the right eye. On Dec. 4, 1894, the left eye was enucleated. It was impossible to divide the eye without first decalcifying in picric acid.

Near the optic nerve entrance, in the nasal portion of the choroid, is a plate of bone, 3*mm* in diameter, and 1*mm* thick, showing concentric build, and containing a medullary space in the centre.

The entire cavity of the eyeball is occupied by a dense bony mass. The bone is separated from the retina, ciliary processes, and iris by a thin layer of connective tissue. The bone passes through the pupil to the cornea, which it seems to enter at one place. On closer examination, however, it is seen that the bone is everywhere covered by the thickened Descemet's membrane. There are few Haversian canals and medullary spaces. The vascular supply of the bone takes

origin in the vessels of the vitreous, which in turn arise from the central retinal vessels.

We have undoubtedly to deal here with an ossification of the anterior portion of the vitreous, the posterior portion being changed to connective tissue, containing a few nests of bone tissue.

Case 6.—J. N., twenty-four years of age, had a purulent conjunctivitis, with perforation of the cornea, in childhood. At the age of twenty-one, the eye was enucleated, on account of pain and inflammation.

It was impossible to divide the eye, with the razor, before it was decalcified.

The entire choroid lies free in the eyeball, in the form of a thick hard shell.

The stroma of the choroid contains well developed bone tissue, which forms a closed ring in the region of the ora serrata.

The retina is entirely detached in the region of the ora serrata, and changed to connective tissue, containing many thin-walled vessels, which show numerous calcareous deposits.

2mm behind the ora serrata, the choroid is transformed in its entire extent into a thick bony shell, perforated posteriorly by the optic nerve.

Case 7.—A. N., twenty-five years of age, had an attack of ophthalmia neonatorum, followed by a diminution in size of the left eye. At the age of twenty-three, the right eye began to pain, and became inflamed. Left eye was found to be normal, and the right eye atrophic and hard. The eye was enucleated and decalcified.

There is a thin layer of connective tissue just within the retina; the remainder of the eyeball is filled in by a dense mass of bone, containing well formed medullary spaces with red marrow. The bone is nourished partly by the retinal vessels, but principally by the ciliary vessels. We have undoubtedly to deal, here, with ossification of a cyclitic membrane.

Case 8.—P. R., twenty years of age, had ophthalmia neonatorum. Left eye is small, and painful. Eye was enucleated on May 20, 1900.

The interior of the eye, behind the iris, is filled by bone tissue, containing Haversian canals, bone lamellæ, bone cor-

puscles, and well developed medullary spaces, which contain pigment cells, marrow cells, enucleated cells containing hæmoglobin, and a few osteoclasts. The bone is surrounded by a thin layer of connective tissue, which takes the place of a periosteum.

A few small bone islands are seen between the ciliary processes.

This is another case of ossification of a cyclitic membrane, with some ossification of the outer layer of the choroid.

Case 9.—A. N., thirty years of age, received a blow in the right eye, ten years before. The eye was inflamed four months, followed by blindness. In the last six months, it again became inflamed and painful. It was enucleated on June 20, 1901.

In a connective tissue layer, which had formed between the detached pars ciliaris retinæ and the pigment epithelium, is a plate of bone 1*mm* wide and 0.5 *mm* thick.

Internal to the vascular layer of the choroid, is a large mass of bone tissue, especially in the temporal half of the eyeball, where it is 4*mm* thick, becoming only 0.3*mm* thick in the nasal portion. The bone is very spongy. It is surrounded by thin osteoid tissue. The retina shows cystic degeneration, many of the spaces containing calcareous deposits.

XII.

MAGNET OPERATIONS ON THE EYE.

By Prof. H. SCHMIDT-RIMPLER, Halle.

The introduction of magnet operations on the eye into ophthalmology is largely owing to the efforts of Hirschberg and Haab.

The author has used Hirschberg's hand magnet and Haab's large electro-magnet in 38 cases of foreign body in the eye. In only 3 of the cases was the Haab magnet non-efficacious.

In 4 of the cases, the point of entrance of the foreign body could not be detected. In 19 cases, it was in the cornea, and in 15 cases in the sclera. In 3 cases, the iris was torn.

In 10 cases, the foreign body was in the anterior portion of the eye, including the lens; in 28 cases, in the posterior portion. The foreign body was visible in 7 cases; twice in the lens, four times in the anterior chamber, and once in the vitreous.

The foreign body was withdrawn through the entrance wound in 6 cases; once through the cornea, twice through the limbus, and three times through the sclera. A new scleral incision was made in 3 cases. The anterior chamber was opened by means of a peripheral corneal incision, without iridectomy, in 3 cases. In all the other cases, that portion of the iris which bulged forward when the Haab magnet was placed before the eye was excised, before the foreign body was extracted.

Of the 35 patients in whom the extraction was successful, 17 retained useful vision. Of these, 14 had a vision of over $\frac{1}{3}$, and of these, 5 had a vision of between $\frac{2}{3}$ and 1. Of the remaining 18, 4 had to have enucleation done, and 5 exenteration. In the remaining 9 cases, vision varied between quantitative light perception and fingers at $\frac{1}{2}$ metre.

The sideroscope, which was used in 24 cases, gave correct information in 19 cases, and failed to give any information in 5 cases.

XIII. and XIV.

CORNEAL ASTIGMATISM AND MYOPIC CENTRAL CHOROIDITIS.

By Dr. A. SENN, Wyl.

The author has found that corneal astigmatism is found very frequently in the central choroiditis of high myopia, and believes that there is a causal connection between the two. He gives two tables, one containing all the cases seen by him from 1894 to 1902 of central choroiditis with myopia, giving the sex, age, Javal-astigmatism, spherical refraction, corrected central vision, and ophthalmoscopic condition; and the second one containing all the cases with myopia above 7.0 D., without ophthalmoscopic changes in the macula.

One hundred and twenty-five cases with central choroiditis are recorded, of which 205 eyes are available for the author's purposes.

The average age is 36.3 years. 24 % are males, and 76 % females.

Steiger and Fähndrich have shown that high degrees of astigmatism are more common in females than in males.

The second table, containing myopic eyes without macular changes, contains 99 cases. Of these 46.9 % are males, and 53.1 %, females. The average amount of astigmatism is much lower in these cases than in those of the first table.

Of the 205 eyes with central choroiditis, 78.1 % have a high degree of astigmatism. Of the 196 eyes without central choroiditis, only 27.6 % have marked astigmatism.

The author believes the pathological changes in the macula to be due, firstly, to dehiscence of the tissue, as a result of excessive stretching, and, secondly, to a reparative process.

He believes that in addition to the myopia, the astigmatism has a distinct influence upon the occurrence of the choroiditis.

The author finds that in the cases of choroiditis, the lower grades of myopia are accompanied by the higher grades of astigmatism.

He concludes from a review of his cases that where a myopia is complicated by an astigmatism of over 2.5 or 3 D, a central choroiditis develops, before the myopia reaches 18 D; and on the other hand, where a myopia of 8 D or less is complicated by a central choroiditis, we almost always find a high degree of astigmatism.

The mean of all the cases with central choroiditis is 33.6 years. Of all the cases above this age, only one has an astigmatism of over 2 D. Of the cases under this age, all possess an astigmatism of over 2 D, except two.

Twenty-two of the cases of central choroiditis with myopia and astigmatism were carefully corrected, and watched a little over two and one-half years on the average. During this time, there was an average improvement of vision of 0.05.

XV.

PRIMARY ATROPHY OF THE CHOROID, WITH SCLEROSIS OF THE VESSELS,—"ATROPHIA ALBA CHOROIDEÆ."

By Dr. N. J. CUPERUS, Zwolle.

Mr. S., formerly publisher, seventy years of age, was always in good health. No venereal history. No consanguinity in parents. Moderate smoker and drinker. His sight was very good until the age of thirty, from which time his central vision has been gradually diminishing. There were never any inflammatory symptoms. No history of hemeralopia.

His grandmother and one of his brothers died blind, and another brother is blind at the present time. The second brother was seen by Dr. van der Meer of Maastricht. His eye condition, as described by Dr. van der Meer, was exactly like that of the author's patient.

Vision, O. D., fingers at $\frac{1}{4}m$, with excentric fixation; O. S., fingers at $10cm$, with excentric fixation.

The field of both eyes shows an absolute central scotoma.

Ophthalmoscopic examination shows the media clear. The fundus shows the same changes in both eyes.

Immediately around the disc, for a distance as far as the macula, the fundus is very light in color. Farther outward, it is light brown. The vessel walls of the choriocapillaris are chalky white. The vessels are entirely empty. Farther outward, they become pinkish, and near the ora serrata they take on their normal color. Here and there, black spots are seen, in the neighborhood of the retinal vessels. The disc is light gray, and excavated to a depth of $1mm$. The retinal arteries are very narrow.

Diagnosis.—Atrophy of the choroid, with advanced sclerosis of the choroidal vessels, with secondary atrophy of the retina and optic nerve.

It is distinguished from retinitis pigmentosa by the absence of hemeralopia, and the central scotoma with normal peripheral boundary of the field.

It is distinguished from syphilitic chorioretinitis by the absence of circumscribed patches in the retina or choroid,

the absence of pigmentation with opacities of the vitreous, and by the absence of anomalies of the lens or iris. The patient absolutely denies syphilis.

Similar cases have been reported by Jacobsohn, in 1888, by Fuchs, by Levinsohn, and by Haab, in his *Atlas of Ophthalmoscopy*.

XVI.

A CASE OF EXTRACTION OF A FRAGMENT OF STEEL FROM THE LENS, WITH PRESERVATION OF ITS TRANSPARENCY.

By Dr. OTTO FEILKE, Frankfurt.

O. M., a medical student, twenty-three years of age, while cutting through an iron barrel-hoop with a chisel and mallet, felt a sudden pain in his right eye. An hour later, he appeared in the clinic, where examination showed the following:

In the middle of the cornea, was a vertical wound, about 1*mm* long, which was already closed. There was a similar wound in the centre of the anterior lens capsule. Behind this rent, in the anterior cortex of the lens, was a fragment of iron, about 2*mm* long. The iris was normal. Around the foreign body, over an area of about 2 sq. *mm*, the lens was cloudy.

The eye was placed before the large Schlösser magnet, and the foreign body was drawn into the anterior chamber. An incision was made through the lower outer margin of the cornea, and the fragment extracted with the small Hirschberg magnet.

Several drops of a 2 % solution of eserin were instilled into the eye, a double bandage applied, and the patient put to bed.

On the evening of the same day, the bandage was changed, and it was seen that there were no inflammatory signs, the area of opacity in the lens had not enlarged, the lens was not swollen, and the tear in the capsule was practically closed.

On Nov. 25, nine days later, vision was $\frac{5}{15}$. With stenopœic glasses, the vision is improved to $\frac{5}{7.5}$.

The opacity in the cornea diminished somewhat.

Eight months later, it was seen that the opacity in the lens had not increased in size. Vision $= \frac{5}{5.7}$; there is monocular diplopia. With stenopœic glasses, vision $= \frac{5}{5}$.

The author believes the good result in this case to be due to the prompt removal of the foreign body, with absolute rest of the eye, the double bandage precluding the possibility of accommodative changes of the shape of the lens, and the miotics, by causing contraction of the pupil, allowing the edges of the wound in the lens to come as near together as possible.

XVII.

A CASE OF NEW-FORMED VENA OPTICO-CILIARIS RESULTING FROM CHOKED DISC.

By Dr. J. R. van GEUNS, The Hague.

In the normal eye, there is an anastomosis between the ciliary vascular system and the central retinal vessels, by means of numerous small arteries, veins, and capillaries, which pass from the choroidal margin into the papilla. In some cases, these vessels may become sufficiently enlarged to become ophthalmoscopically visible. These are called optico-ciliary, or retino-ciliary vessels. Retino-ciliary veins are not as common as cilio-retinal arteries.

Willem M., seven years of age, first became sick at the end of September, 1901. He had severe headaches, dizziness, and vomiting. Walking was difficult, and speech slow. He was examined by Prof. Koster, and Dr. Van der Hoeve, in Leyden, who found a papillitis in both eyes. They found no sign of any abnormal veins. A diagnosis of cerebral tumor was made. On October 22, 1902, the patient was first seen by the author.

In the right eye, the disc has a grayish white color, radial striations, and indistinct edges. The veins are dark and wide. The arteries are normal. From the middle of the disc, a broad dark vein emerges, of about the same calibre as the main trunks of the central vein, and passes in a sharp curve to the temporal margin of the disc, where it disappears into the depths of the choroid.

In the left eye, the disc also shows the picture of a post-neuritic atrophy. From the middle of the disc, two small veins pass to the temporal margin of the disc, where they disappear.

These optico-ciliary veins were formed within a few months, as they were not present when Prof. Koster saw the case.

The vision remained fairly normal in this case, probably on account of the establishment of this collateral circulation.

Optico-ciliary veins in normal eyes have different characteristics from those in diseased eyes. The direction of the blood-current is different in both cases; in the latter case it is from the disc to the choroid, and in the former, from the choroid to the disc.

XVIII.

A CONTRIBUTION TO THE STUDY OF PERIBULBAR CARCINOMA.

By Dr. WIKTOR REIS, Lemberg.

K. N., seventy-two years of age, appeared at the Lemberg Hospital on Nov. 23, 1902, with a large tumor occupying the right orbit. In May of the same year, he noticed a slight redness and swelling near the inner angle of the eye. The swelling increased in size, and finally vision was gone. He did not consult a physician up to the present.

The mass protrudes from the right orbit, is elliptical in shape, and nodular. It covers the upper and lower lids, and is attached to the nasal portion of both lids. The surface of the tumor is purulent and bloody. The eyeball cannot be seen. No enlarged lymph glands.

On Nov. 26th, the entire contents of the orbit were removed, including the upper and lower lids. The wound was allowed to granulate.

Up to the present, there has been no recurrence.

Examination of the tumor shows it to be a carcinoma, which took its origin from the conjunctival epithelium at the corneo-scleral junction.

Its malignant nature is shown by the numerous mitotic figures, the spherical form of the cells (this being a change from the form they possess in the mother tissue), and by the tendency to retrogressive changes.

The tumor surrounds the eyeball on all sides.

The eyeball is not perforated by the tumor mass, at any point. There is no secondary carcinoma within the eyeball.

The eyeball is in a phthisical condition, due to pressure of the tumor, and reactive inflammation.

The tumor is adherent to the nasal portion of both lids, as the result of inflammatory changes. Nowhere does it pass into the adenoid layer. The mucosa of the lids shows numerous follicles and cysts, changes which are found in all irritative conditions and chronic catarrhal conjunctivitis.

XIX.

ON INJURIES OF THE OCULAR MUSCLE.

By Dr. JULIUS FEJER, Budapest.

Traumatic paralysis of the ocular muscles can result either directly or indirectly. The ocular muscles are well protected, so that it is necessary for a cutting instrument to pass through several layers of tissue before it reaches the muscle.

Indirect traumatic paralysis may occur in various ways. It may result through injury to the surrounding bone, or through injury to the nerves supplying the muscles. Of the former variety, D. Por and M. Mohr have reported cases. Of the latter variety, Goldzieher reported a case, where all the nerves passing into the orbit through the orbital fissure, were cut through. The traumatism may cause fracture at the base, or hemorrhages into the nerve nuclei.

The traumatic division of one muscle is very rare. Beer described a case, where a medical student was wounded near the outer commissure with a pipe-stem. This was followed by exophthalmos and convergent strabismus.

Bernarding reported a case of injury to the superior oblique, by the point of a fencing foil. Other cases were reported by Mackenzie, Cooper, von Graefe, Berlin, Guttmann, Hasner, Philippsen, and Viciano.

The following case was seen by the author:

A boy, nine years of age, was wounded in the right eye with a toy sword. On examination, a bluish hernia-like mass appeared between the lids, at the inner angle of the eye, covered by bulbar conjunctiva. Tension was normal. Vision = $\frac{5}{10}$. Fundus normal. The eye was cleansed and bandaged. The little hæmatoma gradually became ab-

sorbed, but the boy complained of diplopia, every time the bandage was changed. The movement of the eye inward is limited. There is crossed diplopia. When a red glass is placed before the right eye, the red flame is seen to the left, somewhat higher, and oblique. There is probably an injury of the inferior oblique.

A week later, the diplopia had disappeared.

It is unnecessary to search for the divided muscle ends, immediately, and try to unite them, since the division is usually only partial, and they usually heal together, without any difficulty.

XXI.

A CASE OF DOUBLE PERFORATION OF THE EYE BY A FRAGMENT OF IRON.

By Dr. AD. GENTH, Basel.

W. O., locksmith, eighteen years of age, while at work on a boring machine, felt something strike his right eye. There was slight pain, and blurring of sight. This occurred on March 4, 1903. On March 8th, the patient came to the clinic, showing a slight redness of the temporal portion of the bulbar conjunctiva of the right eye. About 3 to 4*mm* to the temporal side of the limbus is a closed wound, about 2*mm* long. The media are clear. The ocular tension is markedly diminished.

Ophthalmoscopic examination shows a round white patch, about $\frac{1}{3}$ the size of the papilla, somewhat above the macula. Within and about the patch there is some pigmentation, and some hemorrhage. Vision = $\frac{1}{5}$.

There is an absolute scotoma in the visual field, corresponding to this patch.

The patient was put to bed, the eye bandaged, and an ice-bag placed over the eye.

On April 27th, the patient was discharged. There is no pain. Media are clear. The scotoma is somewhat diminished. Tension normal. Vision = $\frac{1}{5}$.

After many attempts, Mr. Wilhelm Mayer finally succeeded in taking two X-ray plates, which showed the location of the foreign body in the orbit. It is seen on the floor of the orbit, 4–5*mm* behind the globe.

XXIII.

ACQUIRED PIGMENTATION OF THE POSTERIOR SURFACE OF THE CORNEA.

By Prof. J. OELLER, Erlangen.

Acquired pigmentation of the posterior surface of the cornea is an exceedingly rare affection, when we exclude the pigmented deposits on Descemet's membrane, which occur in the course of a cyclitis, and the corneal remains of a persistent pupillary membrane.

The author observed three such cases.

The first case, seen eight years ago, was in a woman of forty, who had a large central corneal opacity in the right eye, for which an optical iridectomy was performed. Several months later, the patient was again seen, at which time there was observed a sharply circumscribed, rounded, dark brown patch on the posterior surface of the cornea, partly behind the central opacity, and partly internal to it. The remaining portions of the cornea were perfectly clear. The condition remained stationary over a period of many years.

The second case was in a female of forty-seven, who had had repeated attacks of inflammation of the eyes. At the age of thirty-seven, she was operated upon the right eye, and two years later upon the left. Good vision was obtained in the right eye, but not in the left. After ten years, the vision rapidly diminished in the right eye.

In the left eye, fingers are counted at one meter. Pupil occluded by membrane. Broad coloboma of iris, above. Optic atrophy. Right eye, $V = \frac{6}{20}$. Broad coloboma of iris, upward and inward. Posterior synechiæ. Shallow anterior chamber. Opacities of vitreous. Pallor of nerve. At the upper part of the sclero-corneal margin is an oval brown patch, on the posterior surface of the cornea. It is $1\frac{1}{2}$ by *2mm* in size. The middle portion is brownish black, the edges yellowish brown.

The third case showed distinctly the origin of the pigmentation.

K. W., fifty-four years of age, came to the Polyclinic in January, 1901. He had a cataract in the left eye. The

right eye had been operated on for cataract, two years previously. In the lower outer quadrant of the cornea of the right eye is a sharply-outlined brown patch, $3\frac{1}{2}$ by 3*mm*, on the posterior surface of the cornea. The central portion is brownish black, and shows irregular radial markings, and the peripheral portion is a light brownish yellow. In the lower part of the anterior chamber there is seen, floating about, a piece of pigmented tissue, $2\frac{1}{2}$ by $\frac{1}{2}$*mm* in size. The iris is tremulous. There is a secondary cataract.

The history of the case is as follows: On July 18, 1899, a senile cataract was removed from the right eye. Section downward. No iridectomy. Cystotomy. Delivery of the nucleus piecemeal. Numerous cortical masses expressed.

When bandage was changed for the first time, on July 20th, it was seen that the anterior chamber was restored; the lower third of the cornea was the seat of transversely striated opacities. The pupillary region contained numerous opaque cortical masses. On the posterior surface of the cornea, in the lower outer quadrant, was a pinhead-sized patch of iris-pigment. On Aug. 8th, the lens matter was all absorbed, and the patient was discharged with a corrected vision of $\frac{6}{12}$. The pigment patch was still attached to the cornea. A short time later, a portion of the pigment mass broke loose, and swam around loose in the aqueous. Ten months later, he was again seen, and it was seen that the pigment patch on the cornea had not changed, but the free piece of pigment had become reattached to the iris.

The pigmentation in this case undoubtedly resulted from the fact that, due to the difficult delivery of the lens, a piece of retinal iris pigment was detached from the iris, and became attached to the posterior surface of the cornea.

The pigment patch was, in all three cases, found near the operative scar. This is undoubtedly due to the fact that the lymph stream is toward the wound, until it is completely healed.

It is very likely that the two first cases observed by the author occurred in the same way.

The conditions which are favorable for the attachment of a piece of pigmented tissue to the cornea are obliteration of the anterior chamber, the formation of folds in Descemet's

membrane, and loss of endothelium from the posterior surface of the cornea.

In all three cases, the patch is darker in the centre than at the periphery. It is probable that some of the pigment was dissolved out of the fragment of iris tissue, and then taken up by the surrounding endothelial cells, thus increasing the size of the original patch.

XXIV.

A CONGENITAL ANOMALY OF THE IRIS.

By Dr. C. HAEBERLIN, Berlin.

Mrs. A. H., fifty-five years of age, came to the Munich Eye Clinic, on Nov. 4, 1902, on account of asthenopic symptoms. She had no eye disease at any time. She had no knowledge of the malformation in her iris.

On examination, the nasal portion of the iris of the left eye is seen to be somewhat narrower than the temporal portion. From the nasal portion of the anterior surface of the iris, in the region of the circulus iridis minor, involving about $\frac{1}{6}$ of its circumference, springs a triangular tab of iris tissue, passes in front of the pupillary portion of the iris, and is inserted into a vertical swelling on the anterior lens capsule, about *2mm* long.

The pupillary margin of the iris is freely movable.

The swelling on the anterior lens capsule is about three times as high as it is wide. It is yellowish white in color, and covered by numerous pigment patches. To the nasal side of the swelling, there is some opacity in the lens.

At first sight this seems to be a persistent pupillary membrane. But if this were the case, the tissue would not be so similar to the normal iris tissue, nor could the swelling on the lens be thus accounted for.

It cannot be the result of an iritic process, since in that case the posterior surface of the iris would have become adherent to the lens.

The most probable explanation of the phenomenon would be as follows:

During fetal development, there occurred a localized irritation of some sort on a portion of the anterior surface

of the iris, which caused an excessive growth of iris tissue at this point. This proliferated tissue became adherent to the anterior lens capsule with its vascular membrane. The growth of the iris, peripherally, resulted in a tugging at the point of attachment to the lens, with a tear in the anterior lens capsule. Between the torn edges of the capsule, there developed a swollen mass of tissue, with some opacity of the surrounding lens fibres.

XXV.

A CASE OF CARTILAGE FORMATION IN THE CHOROID.

By Dr. ORLANDO PES, Turin.

M. D., seventy-eight years of age, was struck in the right eye with the point of a sharp twig, at the age of forty. Thirty-eight years later, the eye was enucleated, on account of threatening sympathetic trouble in the other eye.

The eye is somewhat diminished in size. The lens is gone. There is a detachment of the retina.

There is a plate of hyaline cartilage in the choroid, extending from the papilla to the macula. It consists of a homogeneous matrix, with scattered cells. It is surrounded by perichondrium. The choroid is about twice as thick in this region as elsewhere.

The cartilage was undoubtedly formed from the compact connective tissue in the deeper layers of the choroid, as a result of the long continued irritation of the inflammatory process. There was no sign of bone formation in the eye.

The author does not believe that the cartilage formation is a stage in the process of bone formation. The process in this case had lasted for thirty-eight years, surely long enough for any bone formation to have occurred, had there been any tendency thereto.

XXIX.

A CONTRIBUTION TO THE PATHOLOGY OF HYDROPHTHALMOS.

By Dr. E. G. GROSS, Dresden-Johannstadt.

A boy, seven years of age, came to the hospital in July,

1902. Since his third year, the right eye gradually enlarged, without pain or inflammatory signs.

The eye was very much enlarged. No lagophthalmos. Cornea somewhat opalescent. Anterior chamber deep. Iris atrophic; pupillary reflex, barely perceptible. Deep excavation and atrophy of the disc. Some increase of tension. V = uncertain perception of light. The eye was enucleated, a canthotomy being necessary, in order to deliver the eye.

Antero-posterior diameter of eye	= 30*mm*
Vertical diameter	= 25*mm*
Depth of anterior chamber	= 3.5*mm*
Base of anterior chamber	= 12*mm*.

Cornea is thinner than normal. The epithelium is slightly thickened in places. The sclera is thinned, especially in the equatorial region. The lens is relatively small. The posterior chamber is enlarged. The zonula fibres are stretched out, and the ciliary processes elongated and atrophied. The iris is atrophied. There are no adhesions between iris and cornea, at the iris-angle.

The most important finding is the complete absence of Schlemm's canal. The choroid is slightly atrophied. The disc shows a deep excavation, with atrophy of the nerve fibres.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OPHTHALMOLOGY OF THE BRITISH MEDICAL ASSOCIATION.

MEETING HELD AT SHEFFIELD, JULY, 1908.

By Mr. C. DEVEREUX MARSHALL.

WEDNESDAY, JULY 29, 1908. SIR HENRY SWANZY, F.R.C.S.I., PRESIDENT, IN THE CHAIR.

The discussion on the **relation of accessory sinus disease to disease of the eye** was opened by Dr. George Mackay (Edinburgh), and previous to his paper a demonstration on the anatomy of the parts was given by Dr. Logan Turner.

Dr. Mackay said that during the past thirty years, but more especially in the past decade, there has been put on record in ophthalmic and rhinological literature much evidence which goes to prove not only that a large proportion, perhaps the majority, of cases of idiopathic orbital cellulitis and of orbital abscess have their origin in diseases of the nasal accessory sinuses, but also that a considerable number of maladies affecting the textures of the eyeball and its appendages in a more solitary manner may at times be traced to the same source, as direct or as reflex disturbances. In view of the fact that the references to this literature in our textbooks on diseases of the eye are as yet very scanty, he might perhaps here be permitted to mention in passing his indebtedness to the monograph of Eversbusch, published in 1903, and to the later contribution by Birch-Hirschfeld on "Diseases of the Orbit" (1907) which forms part of the ninth volume of the slowly appearing second edition of the *Handbuch* of Graefe-Saemisch. The patient researches of Onodi

have added largely to our knowledge of the anatomical peculiarities of these parts, and in his recently published Work *Der Schnerv und die Nebenhöhlen der Nase* (1907) he has brought together also a large number of clinical references of the highest value to every student of this subject. Time did not permit him to refer here to many briefer communications which have appeared within recent years. To some he would have occasion to refer later. In the meantime he would only add that he felt sure many of us are indebted to the Editors of *The Ophthalmoscope* for the attention which this subject received from them in the April number of that journal.

The Relation of Disease of the Nasal Accessory Sinuses to Diseases of the Eye.

To facilitate discussion it was proposed to submit for consideration the chief ocular and orbital disorders associated with sinus disease, arranged in certain groups, which, if not very precise, might be clinically convenient.

Group I. Mucoceles of the accessory sinuses.

Group II. Sinusitis, acute or chronic, accompanied by obvious external signs of orbital cellulitis, abscess formation, tumor growth, œdema of lids, or apparent dacryocystitis.

Group III. Sinusitis without external signs of inflammation in the orbit or neighboring tissues, but

(*a*) with ophthalmoscopic signs, such as optic neuritis, neuro-retinitis, retinal thrombosis, or phlebitis, etc.

(*b*) without ophthalmoscopic signs but with disturbances of vision, such as central scotoma or limitations of the field of vision, paralyses of ocular muscles, or disturbances referable to the 5th nerve.

Group IV. To this group may be relegated cases in which the association with disease of the sinus has been asserted, but was more questionable.

Group I.—It is doubtful whether the *antrum or frontal*

sinus is sufficiently developed in very young children to permit of a mucocele forming in either cavity in early life.

Opinions differ as to the *relative frequency* of frontal and ethmoidal mucoceles. Accurate statistics were wanted and if forthcoming to-day would be welcome.

Pain and tenderness were usually slight or absent.

Swelling in the affected region was the most prominent sign, and there was often no visual disturbance unless it be diplopia.

The essential *treatment* must be surgical, and to what is already stated in the synopsis he would only add that he had invariably transferred his cases to a rhinologist because their radical cure appeared to him to involve endonasal methods which he did not practise. Some of his cases were published by Logan Turner.

There may, however, be present to-day colleagues who will find in this group points worthy of discussion, but the succeeding groups appear to him to be more attractive.

Group II.—Sinusitis, acute or chronic, accompanied by obvious external signs of orbital cellulitis, abscess formation, tumor growth, œdema of lids, or apparent dacryocystitis.

Acute cases were characterized by more rapid onset of symptoms, more pain and tenderness at the seat of the affected sinuses, and in some instances general pyrexia, but the diagnosis was based on lines similar to those described in chronic suppuration, and he had refrained from preparing a separate chart which would involve much repetition.

While empyema of the antrum was probably of more frequent occurrence than any other, it was almost certainly not the most frequent cause of orbital complications. There appeared to be hardly any reliable statistics available either as to the relative frequency with which orbital abscess arose from sinus disease as compared with other causes, or as to the order of precedence of the sinuses in the frequency of its production.

Birch-Hirschfeld[1] has recently stated as the result of a careful analysis of the records of the Leipzig Eye Clinique that out of 684 cases of orbital inflammation, no less than 409

[1] *Klin. Monatsbl. für Augenh.*, January, 1908, p. 3.

(59.8%) were due to accessory sinus inflammation, and he suggests that the number would probably have been still higher if the nose and accessory sinuses had always been examined. In 129 cases (29.8%) the frontal sinus was the starting-point of the disease, in 89 cases (21.8%) the maxillary sinus, in 83 cases (20.5%) the disease started from the ethmoidal sinus, and in 25 cases (6.1%) from the sphenoidal sinus. In 60 cases (14.7%) several sinuses were affected; thus twenty-five times both frontal and ethmoidal suffered together, twelve times ethmoidal and maxillary, and ten times ethmoidal and sphenoidal were associated.

There was room for discussion, and information was desirable as to the way in which the inflammation was conveyed from the sinus wall to the orbital contents.

Some might wish to discuss to-day the best means of arriving at a differential diagnosis between cases of orbital cellulitis arising from sinus disease and those due to other causes, for instance, tubercular and syphilitic periostitis. The appropriate treatment might also engage attention.

But empyema might be present and yet give no outward and obvious suggestion of its existence. There might be no definite nasal complaint, there might indeed be denial of nasal symptoms. And when even trained rhinologists cannot always make us assured of its presence or absence, or can only develop their convictions after repeated examinations, it was not much to be wondered at that ophthalmic surgeons in the past had often failed to attribute to sinus disease cases which were only characterized by visual disturbances with or without ophthalmoscopic changes.

The most interesting and varied cases were to be met with in the next group—*Group III*,—*Sinusitis* without external signs of orbital inflammation, but (*a*) with ophthalmoscopic signs, such as optic neuritis, neuro-retinitis, retinal thrombosis, or phlebitis, etc. The anatomical relations and the vascular connections of the nasal cavities with the nerves and blood-vessels about the apex of the orbit made it easy to explain such occurrences and the monographs which he had already cited adduce either within their own texts or in their literary references abundant clinical evidence.

That such cases did occur was beyond dispute, but we had

much to learn about them. Just as in the past we had been inclined to attribute orbital cellulitis to periostitis and had paid little regard to sinus disease, so here we had probably overlooked this cause through failure to examine for it systematically.

There was also a considerable mass of evidence justifying the recognition of the second division of this group (*Group III*, *b*), namely, cases of sinusitis without obvious external disease and without ophthalmoscopic changes, but with disturbances of vision, such as central scotoma or limitations of the field of vision, paralyses of ocular muscles, or disturbances referable to the fifth nerve.

Mendel, Jessop, Fuchs, Paunz, Delneuville, Birch-Hirschfeld, Posey, and Hill-Hastings had reported cases of central scotoma, presumably due to retrobulbar neuritis in association with disease of the posterior sinuses, and in some instances the malady was relieved by operation, while in others relief came too late but pointed the moral. Careful and precise observations on the exact limitations of the field of vision in well authenticated cases of sinus disease were much to be desired.

In addition to paralyses of ocular muscles and neuralgias relieved by sinus treatment, another interesting association had been found in the occasional occurrence of glaucoma. De Lapersonne, Paquet, Germann, and Fish had drawn attention to some cases. Birch-Hirschfeld mentioned two in his Leipzig analysis, and he, Dr. Mackay, had recently had one under his own observation in a case of antral empyema.

In *Group IV.* he proposed to include, at least temporarily, ocular affections in which the nasal connection had not been so clearly established. It had been asserted that affections of the cornea (Ziem and Kuhnt), of the iris, of the choroid, and that opacities of the vitreous as well as of the lens might sometimes be traced to the same source of contamination. In short, it would appear that there was no part or function of the eye whose good manners may not be corrupted by evil communications from the upper respiratory passages.

But if this were true only in part, it is evident that every ophthalmologist ought to have some training in rhinology or would need to assume a rhinological partner. In the first

place, however, it is clear that much conjoint work would be required before specialists in either department could diagnose these cases with confidence by their associated signs and symptoms, or be able while recognizing these as concurrent to correctly appreciate their possible independence.

To-day's discussion will doubtless bring forth some expression of opinion also as to the relative position of rhinologists and oculists in the surgical treatment of these cases. Dr. Mackay said he was aware that in this assembly there were some surgeons who practised in both departments, and we should look to them for valuable counsel. In this connection he could not close without drawing attention to Birch-Hirschfeld's paper in the January number of the *Klinische Monatsblätter für Augenheilkunde* and to the very interesting rejoinder by Professor Axenfeld in the May number of the same journal, advocating that ophthalmic surgeons should interest themselves more in the surgical treatment of orbital and sinus affections. But he need not enlarge upon this point for they had the good fortune to have Professor Axenfeld there that day and they would hope to hear him expound his views in person.

Dr. St. Clair Thomson (London) said that the causes of thrombosis of the cavernous sinus were chiefly found in disease of the nose and ear, but the symptoms being so obvious in the eye, they usually came under the observation of the ophthalmic surgeon. The most likely cause of these cases was suppuration in the accessory cavities of the nose; while suppuration in the ear was nothing like so frequent a cause. Infection was very likely to take place through the veins running into the orbit. The sphenoidal sinus being in the most intimate relation with the cavernous sinus, inflammation might easily pass from it to the cavernous sinus, for in such cases the bony wall might be reduced to the thinness of paper, or might even have physiological defects in it. Inflammation was able to pass readily from one cavernous sinus to the other by means of the circular sinus. It followed therefore that inflammation of the sphenoidal sinus was the most likely of any to produce thrombosis. Next to this, pyogenic affections of the ear were the most common. Thirdly, there were the cases in which infection took place through the

ophthalmic vein, while he placed infection through the pterygoid plexus last.

The chief characteristic symptoms were usually connected with the eye, and there might be coexisting meningitis, pyogenic temperature, rapid pulse, rigors, headaches, sickness, delirium, coma, swelling of the palate, etc. The three chief eye symptoms were papillary œdema, chemosis, and exophthalmos, and these developed from six to sixteen days from the onset of symptoms. Paralysis of the ocular muscles was generally present. The condition of the pupil varied. The vision might be good or blindness might rapidly supervene; there might also be tenderness of the eyeball. He showed numerous photographs and diagrams illustrating his cases.

Mr. Sydney Stephenson (London) described a case of thrombosis of the cavernous sinus. The patient was a man aged twenty-seven. For several years he had had thick discharge from the nostrils, with secondary infiltration of the larynx, and later on pus was found in the right ear. The right nostril was bathed in pus and blocked with polypi, and he had a nodule on the left vocal cord. The patient became very ill and both eyes became proptosed and the conjunctiva chemosed, the retinal veins were grossly distended and the arteries small, the disks were hazy but definite papillitis could not be said to be present. Thrombosis of the cavernous sinus was diagnosed, and a bad prognosis given. The patient became worse and developed various abscesses and was suffering from pyæmia, and he died after an illness of about twenty-three days. At the *post-mortem* pus was found covering the surface of the brain and a large amount lay beneath the right frontal lobe. Pus was present in the cavernous and circular sinuses, and a thrombosis extended from one cavernous sinus to the other; there was also pus present in the right orbit, the sphenoidal and ethmoidal sinuses. The conclusion arrived at was that infection had spread from the ethmoidal and sphenoidal sinuses, and had set up a septic meningitis associated with pyæmia. Pneumococci and staphylococci were found to be present.

Dr. W. S. Syme (Glasgow) said that it was surprising that only recently was the connection between sinus and eye

disease brought into prominence. Most interest now attached itself to relationship between diseases of the posterior group of accessory nasal cavities. From the examination of skulls he quite bore out all that had been said by Dr. Turner, and what Onodi had demonstrated, that we might get any variation in the relation of the sphenoidal sinuses to one another, to the posterior ethmoidal cells, and to the nerves, sensory and motor, in connection with the eye. He had found in one specimen an extension of the sphenoidal sinuses practically surrounding both optic nerves, and the bone was reduced to the thinnest possible layer. He thought that as a rule the path of infection was indirect rather than direct, and that the cellular tissue surrounding the internal carotid was a factor. This became infected from the sinus, and the inflammation then spread along vessels and involved the perineural covering.

Mr. Arthur Greene (Norwich) described a case of disease of the left ethmoidal sinus in a boy aged eight, who while suffering from scarlet fever and diphtheria had had a lump opened near the inner canthus four years before. It remained quiet until a month before Mr. Greene saw him, when it again became prominent. On opening it, a quantity of muco-pus was evacuated. The cavity was well curetted, but it had not become obliterated. The points of interest were the age of the patient, the connection with diphtheria, and the fact that had the cavity been drained into the nose from the first, probably no wound would have been made on the surface, but further operation was refused. A radiograph showed that the frontal sinus was not involved.

Professor Axenfeld (Freiburg) said that in order to arrive at a proper estimate of the importance of the cases, we must recognize the fact that acute affections of the sinus may sometimes heal spontaneously by evacuation through the natural passages, while orbital disease may persist and increase because the cavity is a closed one. We may thus not always find the sinus which first gave rise to the disease in an abnormal state. He described a case illustrating this. Diseases of the sphenoidal and ethmoidal sinus cavities might cause compression and inflammation of the optic nerve, and it was expected at one time that acute retrobulbar neuritis might

be so explained. At first it appeared not to be so, until it was realized that the sphenoidal and deepest ethmoidal cells might escape observation during nasal exploration, although they may have caused the trouble, particularly in cases in which the cavities were not separated by bone from the sheath of the optic nerve, which does occur at times.

Dr. Bronner (Bradford) said that every one saw cases of headache only partially relieved by glasses, and in many of these some disease of the nose was present, and these people were particularly liable to complain of drowsiness after reading, and inability to remember what they had read. The most dangerous cases were those of suppuration of the sphenoidal sinus, in which there was not free drainage, and these cases often gave rise to disease of the cavernous sinus.

Professor Fuchs (Vienna) said that in some cases of ethmoidal and sphenoidal sinus disease causing orbital disturbance, nothing was to be made out by simple inspection of the nasal cavity, but if the symptoms were sufficiently urgent these sinuses should be opened from the nose and in some cases they would be found filled with pus or granulation tissue.

Dr. A. Logan Turner (Edinburgh) in his reply said that he wished to draw attention to the question as to whether the rhinologist was justified in opening one or more sinuses in order to exclude the possibility of sinus disease. He would at least like the assurance of the ophthalmologist that all other causes of ocular disease had been excluded. As regards treatment, the simple way of merely opening it led to septic infection of the sinus and a permanent fistula. If the sinus was not obliterated by extensive removal of the bony wall, then thorough drainage of the cavity into the nose was essential and this should only be done by one thoroughly acquainted with the anatomy of the nose.

Dr. Mackay in reply described a case of sinus thrombosis and meningitis arising from infection along the frontal and ophthalmic veins due to anthrax. He urged the further study of scotomata associated with sinus disease and gave details of a case of glaucoma associated with unsuspected antral suppuration.

Dr. W. B. Inglis Pollock (Glasgow) read a paper on **monocular diplopia.**

He said that cases arising from optical conditions in the anterior segment of the eyeball might be separated into two groups, the first with double pupil and the second where irregular refraction by the cornea and lens produced two or more images on the retina (monocular polyopia). The first group included such conditions as a band passing across the pupil, whether congenital in origin or due to inflammatory processes, or the condition of iridodialysis. In these cases diplopia only occurred if the object were out of focus for the eye. Among the second group were a number of varied affections. The lens when dislocated so that the edge passed across the pupil always caused monocular diplopia. Both images were out of focus: the one formed through the margin of the lens was as if myopic, while the other, due to the aphakic condition, resembled hypermetropia.

Irregular corneal refraction from old superficial ulceration occasionally gave rise to diplopia, but generally of an indefinite character. It was more persistent than some of the other forms.

That due to irregular lenticular astigmatism was comparatively rare except when due to incipient cataract. The author had had a case in a child with congenital cataract. Irregular lenticular astigmatism also explained a case of diplopia occurring in ophthalmoplegia interna in a man of thirty. The diplopia had persisted to the present time since first observed four years ago.

The question of the possibility of the retinal origin of monocular diplopia was most interesting. Constentin reported a case where diplopia occurred as the result of detachment of the retina, the entire upper portion of which was applied to the lower half of the retina, the latter still being *in situ* and the light thus affecting two portions of the retina at the same time.

The author's case was a woman with double choked disk. She had diplopia in one eye during the early stage of regression of the œdema; and he advanced the theory that the diplopia was due to a shrinkage of the retina, which

caused slight wrinkling of the layer of rods and cones at the macula. Light converging to a focus would then affect two neighboring regions and so produce the diplopia.

Professor E. Fuchs (Vienna) read a paper on **glaucoma in consequence of cicatrix of cornea, with anterior synechia** (leukoma adherens).

He stated that in cases of ulcer of the cornea before perforation the angle of the aqueous chamber was open, although often filled with lymph; only very exceptionally the swelling of the adjoining tissues might bring the root of the iris in contact with the ligamentum pectinatum in places. After perforation, as long as the aqueous chamber was absent, the iris was applied to the cornea and adhesion might ensue, if the endothelium were stripped off. When the aqueous chamber was re-established, the iris was pulled from the cornea chiefly by the action of the sphincter pupillæ. Where the anterior synechia was present, the sphincter was inactive and therefore the root of the iris remained attached to the back of the cornea corresponding to the site of the anterior synechia, whilst the angle of the aqueous chamber was patent in all other parts. In a small number of cases, however, the angle remained obliterated, the iris being applied to the posterior surface of the pectinate ligament up to the margin of Descemet's membrane, but the root of the iris preserved its normal condition and was not compressed and thinned, if one considered only cases without increase of tension. Obliteration of the angle of the aqueous chamber with normal tension might be brought about, either by the obliteration not being really circular, but being absent in certain places, which had still to be elucidated by the examination of serial sections, or the peripheral synechia not effectually impeding the outflow of the aqueous humor, as long as the iris tissue itself was normal, the aqueous passing into the iris by the crypts, and from the iris into the pectinate ligament.

Dr. W. B. Inglis Pollock (Glasgow) said he had an opportunity of examining three cases with attachment of the pupillary margin of the iris to a small central cicatrix, when the cornea showed no ectasia, nor was the tension raised. In these cases the periphery of the iris was adherent to the

cornea beyond Descemet's membrane in the manner described by Professor Fuchs. Although not carrying out serial sections he was able to see on the opposite side that the angle of the anterior chamber was open, and that was sufficient for keeping the tension normal.

Dr. CRAIG (Belfast) referred to a case with a synechia only $\frac{1}{2}mm$ wide between the periphery of the iris and the cicatrix of a cataract extraction incision. The extraction was done after a preliminary iridectomy and the vision of $\frac{6}{6}$ and J. 1. was obtained. A year later the vision slowly failed through increased tension with cupping of the disk. The question was whether the small synechia was the cause of the glaucoma.

THURSDAY, JULY 30, 1908.

The discussion on **serum therapy** was opened by Prof. AXENFELD (Freiburg). He stated that like all new forms of treatment it had evolved over-sanguine expectations on the one hand, and exaggerated scepticism on the other, and he endeavored to set before the section the true position it occupied. He referred in eulogistic terms to the excellent review of the subject by Percival Hay which had recently been published in *The Ophthalmoscope*. In obstinate cases of blepharitis and hordiola, staphylococcus vaccine from the patient himself, made according to the directions of Wright, might prove useful. Serum therapeutics should be tried in cases of corneal and intraocular infection as an adjunct, but in virulent infections, especially in acute cases, they would not alone be powerful enough. The good effect of diphtheric antitoxin was so well known that it was unnecessary to dwell upon it, but it must be remembered that mixed infections were frequently present. It was doubtful as to how far post-diphtheritic paralysis was influenced by serum—observers differed in their opinions; but it should be remembered that with the serum treatment severe cases recover which would certainly die if it were not used.

Serum should be used not only as a treatment but as a prophylactic against tetanus.

Dunbar's "Pollantin," made from the pollen of grasses, could be applied with good results in cases of hay fever.

Weichart denied the antitoxin character of this serum and made another called "Graminol," and Prof. Axenfeld had found both useful in certain cases but not in all, and the result was often permanent.

To the antitoxin therapeutic agents belonged Roemer's jequiritol serum to arrest violent jequiritol ophthalmia. A strong reaction was essential, but it might become dangerous. He thought that better results might be obtained by subcutaneous injection of the antitoxin instead of simply instilling it into the conjunctiva as most observers had done. The unpleasant complication of dacryocystitis might be avoided by injecting it into the tear sac, and this did not influence the reaction of the conjunctiva.

Much greater difficulties were encountered in using serum against those bacteria which did not produce free toxins, as here the question is how the bacteria are to be rendered innocuous or killed.

The pneumococcus was the most dangerous form of organism. The pneumococcus serum hitherto prepared by Roemer and Merk did not yet fulfil the high therapeutic requirements necessary for the treatment of serpiginous ulcer of the cornea; the serum possessed more curative properties, but did not take the place of surgical treatment entirely. The subcutaneous injection of dead pneumococci did not prove so efficacious.

As hypopyon keratitis and wound infection of streptococci were relatively rare, no great experience of serum therapy had yet been obtained, and no sufficient researches had yet been made regarding staphylococci, but Prof. Axenfeld was still engaged in investigating these.

Prophylactic serum from the patient himself who was suffering from blepharitis, conjunctivitis, etc., should be used before undertaking an intraocular operation, when these septic conditions were not amenable to treatment. For some organisms this was relatively easy, such as for staphylococci, but with pneumococci it was far more difficult, as if cultivated from the eye they displayed but slight virulence. In spite, however, of this they might produce wound infection if they entered the eyeball. Less was to be expected from serum in cases of acute purulent wound infections, although some

good results had been experienced. In cases of acute purulent wound infection, the passive immunisation with an efficient serum should always be considered the best, but the fulfilment of this was often impossible owing to the fact that a suitable serum could not always be obtained, and sometimes it was possible to use a combination of one or more sera. The metastatic eye affections would be more likely to be influenced by serum than the acute. He then discussed the treatment with tuberculin.

In cases of sympathetic ophthalmia some observers have obtained good from the serum of a patient suffering from the disease, but Prof. Axenfeld's experience was that it was negative in the cases he tried it on, and theoretically the prospects were not very good.

In diplobacillary infection it would not be worth the trouble of preparing a serum, for zinc salts do all that is necessary. In trachoma also it would be of very doubtful utility.

Some persons, such as Darier and Deutschmann, assert that as good or better results may be obtained for new specific serum therapy, and they assert that the antidiphtheritic, antitetanic and yeast serums act against all kinds of infection, but this is by no means proved. The necessity for experiments on animals is paramount in working at this subject, and, although the results cannot all be at once transferred to man, yet there is great agreement in many cases and they are of the greatest possible clinical value; but the question of the non-specific serums is by no means settled as yet. He gave details of Deutschmann's experiments with yeast passed through horses, but was by no means convinced of the favorable deductions he had drawn from his experiments.

He stated that up to the present time a very high standard of excellence had been maintained in dealing with these subjects, but he raised a note of warning lest this should be lowered, and the results obtained in other parts of the body were not sufficient for us, for we could only rely on experiments on the eye itself.

Mr. Percival J. Hay said that in going over the literature of serum therapy he was struck with the want of critical faculty in finding results, and he thought that great reserve should be exercised in forming any views as to the value

of any one serum. He thought it open to question as to how far the results of Deutschmann and Von Hippel could be attributed to the serum used.

Mr. Bishop Harman (London) said there were two classes of cases in which successful serum therapy could be of the greatest value—the membranous conjunctivitis due to the staphylococcus, and the other variety was the chronic form of iridocyclitis. The first was too rapid to be able to obtain successful serum from, and as regards the polyvalent serum he thought it savored of the universal quack remedy. With regard to the second class, he had treated them with tuberculin, but had had vastly superior results from the more homely treatment of fresh air in a bracing seaside sanatorium.

Dr. Inglis Pollock (Glasgow) said that non-specific sera required careful testing and a solitary brilliant result was not of much value, especially when dealing with hypoypon ulcers, many of which would clear up under mild antiseptic treatment. He did not put much value on the cure of metastatic gonorrhœal cases, as these were almost invariably of a mild type.

Dr. Hern (Darlington) had used a multivalent serum in a number of cases, but so far without any definitely good result; this was possibly due to our want of knowledge as to what we are dealing with, and to the possibility of one serum neutralizing the other. He was convinced of the great utility of antidiphtheritic serum in cases of diphtheritic ophthalmia.

Prof. Ernst Fuchs (Vienna) had not conducted experiments himself. In his clinical experience the successes he had had were never so marked as to put it beyond doubt that the serum had brought this about. He agreed with Prof. Axenfeld that it was by experiment only that the efficiency of a serum could be really tested.

Mr. Arthur W. Ormond (London) had used the jequiritol treatment in cases of dense corneal opacities, and when a sufficient reaction had been produced he had used the anti-jequiritol serum. He was much impressed with the rapid and complete subsidence of the artificially produced inflam-

mation, a result which convinced him of the efficacy of the serum.

Prof. AXENFELD briefly replied.

Filtering Cicatrices by Two Methods.

Colonel H. HERBERT showed eight glaucomatous eyes which had been operated upon by the "wedge-isolation" method, and two in which tension had been relieved by a form of sub-conjunctival paracentesis. The communication dealt chiefly with the former operation. Sixty-three primary glaucomas had been treated by this method. Though only about a third of them had been under observation for more than six months afterwards, probably sufficient indications had been given of the final results as regards tension in practically all of the cases. In two cases incomplete reduction of tension had necessitated repetition of the operation, and in one other case there had been some return of tension, apparently only temporary. Another eye had been made much too soft for a time by the formation of a wide fistula, but the tension had risen again to about —1 and the vision had improved a little. Other fistulæ which formed had not reduced the tension excessively, and in the majority of the cases the reduction had been brought about without any visible fistula. Filtration was shown merely by conjunctival œdema and by complete relief of tension, with retention or improvement in vision.

The details of the operation were described minutely, and the precautions emphasized which were necessary to avoid the formation of a wide fistula, on the one hand, or imperfect relief of tension, on the other hand.

It was admitted that the performance of the operation required much more care and attention to detail than Lagrange's, but it was thought that better and more uniform results could be attained by it. Variations from the typical result appeared to be due solely to easily recognizable faults in technique, and should therefore prove to be preventable.

A case of chronic simple glaucoma was shown in which apparently permanent filtration had been produced by sub-conjunctival paracentesis. The field of vision was extremely contracted, and the fellow eye blind, so that any larger

operation had not appeared justifiable, though the vision was thought to be deteriorating under treatment by eserin drops. From experience of this operation upon absolute glaucomatous eyes, the resulting filtration was found to be limited, and the operation did not seem to be indicated for the preservation of vision in ordinary glaucomatous eyes.

Major H. Smith, I. M. S., said that Colonel Herbert admitted that his object was to establish a permanent subconjunctival drain and the results he showed were excellent, but there appeared to be no permanent drain and the result seemed to be due to a temporary drain followed by a hard non-filtrating scar. He thought it more probable that the explanation of the good result was that the temporary drain allowed the physiological equilibrium to be re-established; still, he had an open mind on the subject and said he would try the operation. He had seen many permanent subconjunctival drains follow operations, and usually these eyes had become soft and the retina atrophied, and he personally felt disposed to avoid a permanent drain. He thought the operation should be done open, the conjunctival flap completely cut, and a portion of the sclerotic should be excised; a conjunctival flap was of course essential.

Colonel Maynard, I. M. S., congratulated Colonel Herbert on his excellent results, although opinions differ as to how these were brought about. The difficulties of the operation, which appeared to be great on reading the description, were really far less in practice. The peripheral iridectomy was omitted in some cases which showed good results, and he thought that these cases only should be taken account of in considering the merits of the operation. He had performed Lagrange's operation a few times, but experienced difficulty in knowing how much sclerotic he should remove. Possibly the use of Vacher's scissors would ensure a more even sclerotomy.

Mr. Whitehead (Leeds) asked whether any long series of cases had been reported. He had done about twenty consecutive cases by Lagrange's method with good results. His impression was that large iridectomies gave the best results, and until a large number of cases had been reported he thought it impossible to compare the two methods.

FRIDAY, JULY 31, 1908.

The discussion on **color vision and its anomalies** was introduced by Dr. F. W. Edridge Green. He divided cases of color-blindness into two classes, which were distinct from each other, but both of which might be present in the same person. In the first class there was light as well as color loss. In the second, the perception of light was the same as in the normal-sighted, but there was defect in the perception of colors. In the first class, certain rays, such as the dark red rays, were not perceived at all, or were very imperfectly seen. Color-blind persons belonging to the second class could be arranged in series. At one end were the normal sights, and at the other end the totally color-blind; and the others he arranged according to the number of colors they saw in the spectrum. Thus, the normal-sighted who were able to see six colors he designated as hexachromic: those who saw five, pentachromic: those who saw four, tetrachromic; those who saw three, trichromic; those who saw two, dichromic, and the totally color-blind, monochromic. There were many degrees in the dichromic. There might or might not be a neutral band separating the red and violet colors of the spectrum, and the wider this neutral band, the greater was the degree of color-blindness. The tests he used were three in number: (1) The lantern; and he showed two varieties he had introduced for this purpose. (2) The classification test, which consisted of colored wools, silks, cards, and glass. (3) The spectroscope. In all these tests the candidate was required to know the names of the primary colors, red, yellow, blue, and green, and matching was not employed. In the spectrum test the examinee was required to point out the commencement and the termination of the spectrum, to designate the various colors, and show, by a special apparatus, the size of the different portions of the spectrum which appeared to him to be monochromatic.

Dr. CECIL SHAW (Belfast) said he had been examining a number of students by both Holmgren's and Edridge Green's tests, and, though he had not examined a sufficient number to enable him to come to any conclusion as to the comparative merits of the tests, he thought that the proportion of color-

blind found among the educated classes was much less than was generally given in books.

Mr. Devereux Marshall (London) said that Dr. Edridge Green was much to be congratulated on the excellence of his work, and for devising such excellent tests, which were far the best ever employed. He did not at all agree with Dr. Cecil Shaw in thinking that educated persons were less color-blind than uneducated ones, for given a case of color-blindness, it was impossible even to really improve it, although by education crowds of them could pass the Holmgren test perfectly, and thus deceive the examiner, if this were the only test he relied on.

Major W. S. Pridmore, I. M. S., wished to thank Dr. Edridge Green for his excellent paper, and he also asked if color-blindness was more common among the uneducated. In India particularly he had felt the need of a simple test. He had passed scores of natives for railway and marine service by the matching test alone.

Lieut.-Col. Maynard, I. M. S. (Calcutta), said that some aboriginal tribes in India had only names for two or three colors, and therefore matching tests for them were a necessity. Investigation of the colors recognized and named by such people might lend support to Dr. Edridge Green's theory.

Mr. Tomlinson (London) laid stress on the value of a projection spectrum over that seen in an ordinary spectroscope. He described and showed a lantern he had designed for giving a projected spectrum in the consulting room. Any part of the spectrum might be completely isolated by means of shutters, or any of the colors might be mixed.

Dr. Edridge Green, in reply, said that Mr. Tomlinson's projection spectroscope was most ingenious and useful. As regards the question as to whether educated persons were less color-blind than uneducated, he was quite certain they were not, but the tests in common use were so very bad that large numbers of normal-sighted persons, especially the ignorant ones, were considered to be color-blind, when in reality this was not so; and in addition vast numbers of educated color-blind persons who were not too grossly color-blind could readily pass the Holmgren test, and it was this which gave rise to the false impression mentioned by Dr.

Cecil Shaw. He thought that as no matching test was of the least value, it was absolutely necessary that color names should be used, no matter how savage and ignorant certain races might be. If such people were to be employed, as Major Pridmore had said, for railway and marine work, it would be impossible for them to work signals unless they did know the names of the primary colors; and if they could not be taught them it was quite certain they were mentally unfit to take charge of machinery.

Mr. N. Bishop Harman (London) read a note on the use of glycerine as an adjuvant to silver nitrate. He commented on the various albuminoid preparations of silver which chiefly held their sway owing to the fact that they caused less pain on application than nitrate. He had found the following far less painful than a simple watery solution. To a half, one, or two per cent. of silver nitrate in distilled water he added fifteen per cent. of pure glycerine. This raised its specific gravity, and greatly increased its penetrating power. It was distinctly less painful and more efficient than the ordinary solution. He colored the solution by a trace of rose anilin.

Mr. Bishop Harman also showed a hollow spear-headed needle for tapping the anterior chamber. By this instrument a certain amount of aqueous could be withdrawn absolutely free from contamination.

Mr. Bishop Harman also demonstrated a convenient mode of fastening spectacle frames on infants. Spectacles were a necessity for some infants in the treatment of squint. Curved sides could not be used, as they would have to be so stiff as to be impracticable. The usual plan was to tie them behind the nucha with tape or elastic, and this usually produced abrasions of the nose and the top of the ears. His method completely avoided this. A piece of tape or elastic was looped under the nucha, its ends threaded through the eyes of the spectacle bows, then carried to the vertex, where they were tied together. This circuit of tape held the spectacles firmly in position, yet allowed sufficient elasticity to avoid pressure on the nose, and the bows were not dragged down on the top of the ears. He preferred this to curled sides for children under seven years of age.

Dr. Thomson Henderson (Nottingham) read a communi-

cation on **anatomical factors bearing on the pathogenesis of glaucoma.** He said that primary glaucoma was the component of two factors, the first constant and brought about by the physiological sclerosis of the cribriform ligament, and the second variable and vascular. The sclerosis of the cribriform ligament diminished the outflow through Schlemm's canal, and threw a greater proportion of the work of drainage on the iris crypts and veins. If the crypts were not equal to the work, then the tension slowly and impalpably rose—chronic non-congestive glaucoma. The intraocular fluids (vitreous and aqueous) transmitted pressure equally in all directions, and therefore when their exit was diminished and tension rose, the whole elastic intravascular system tended to be converted into a rigid one. Hindrance to the free exit of aqueous through Schlemm's canal could not be the cause of the deepening of the anterior chamber in either "serous" cyclitis or simple glaucoma, as with a free and open pupil the pressure in the anterior chamber could not rise above that in the posterior aqueous chamber, in which too the aqueous was found. In pathological, as in physiological states of the intraocular tension there was pressure discontinuity within the globe of the eye. In an eye with a tendency to glaucoma, *i. e.* with a sclerosed cribriform ligament and therefore diminished range of outflow, a congestive glaucomatous onset would be precipitated by any conditions which could cause:

1. Dilatation of the pupil and so closure of the iris crypts, the sole remaining aqueous outlet.

2. Rise in arterial pressure, which raised the intraocular tension—now uncompensated, as increased outflow could not now take place—so that tension mounted from capillary venous to arterial pressure.

3. Rise in venous pressure. Congestion implied not only increased volume of venous blood in the eye, but diminished absorption, already reduced to a minimum. The difference between chronic non-congestive and acute congestive glaucoma was one only of degree, and not of kind. With the rise in intraocular tension the whole of the uveal tract participated equally in the resulting congestion and œdema. The amount and extent of the occlusion of the angle of the

anterior chamber depended directly on congestive œdema of the iris, causing its base to become applied and then adherent to the posterior surface of the cornea. Once started, this process automatically increased with each congestive attack. The forward displacement of the ciliary processes, whether congested or atrophied, was not the cause, but the effect of the adhesion of the iris to the posterior surface of the cornea. The shallowing of the anterior chamber was also a secondary manifestation of congestion and œdema of the uvea. It resulted from swelling at the chief seat of origin of the zonular fibres—the orbiculus ciliaris—causing slackening of the suspensory ligament, which allowed the lens to assume a more forward position. Treatment did not affect the route to Schlemm's canal, already made impossible, but depended altogether upon the iris for its success. The greater the disorganization, the less did treatment avail. Myotics were beneficial in proportion as they opened out the existing iris crypts, while iridectomy resulted in making a large crypt through which the aqueous could come into direct contact with the iris veins, for wounds of the healthy iris did not cicatrize.

Mr. A. F. MacCallan (Chief Ophthalmic Inspector, Public Health Department, Egypt) read a paper on **ophthalmic conditions in the Government schools in Egypt and their amelioration.** He reminded the meeting that at the last meeting of the British Medical Association he read a paper describing the work which had been carried on in Egypt by the ophthalmic hospitals during the previous four years, and this year he proposed to report on the clinical work at the two travelling hospitals during 1907. The number of new patients treated was 7446, about one-third of the actual applicants. The average number of attendances of patients under regular treatment was 19; 3173 patients were seen who were incurable, and who were sent away after the first examination. The total number of operations performed was 6794, of which 194 were for the removal of cataract; 2175 cases of absolute blindness were seen, in 326 of which the cause was primary glaucoma. The number of patients blind in one or both eyes was 8.7% of the total examined; 2197 persons were seen who had been operated upon

unsuccessfully by charlatans for trichiasis: in most of the cases lagophthalmos had been produced without curing the trichiasis. The work has been carried on during the last year by the two travelling hospitals originally established by Sir Ernest Cassell. One new permanent hospital established and maintained by the Government will be opened this year, and a permanent hospital, built partly by local effort but maintained by the Government, will be opened next year. The Egyptian Government has been kept fully aware of the ophthalmic needs of the country during the last year by Mr. Graham, the Director General of the Public Health Department; and it is probable that money for further ophthalmic relief will be forthcoming from the Ministry of Finance as soon as the results of the recent financial depression have disappeared. He said the objects of treatment should be to produce cicatrization as quickly as possible and with a minimum deposition of fibrous tissue. Trachoma, he said, was a disease which usually required surgical intervention, and could rarely be cured by drugs alone in Egypt. He then discussed the possibilities of obtaining ophthalmic treatment in Egypt, and gave some of the reasons why treatment had been so little sought in that country in the past. 95.67% of the pupils in the schools of Tantah showed signs of active or passing trachoma. More than 82.5% had subnormal vision, and 45.5% had opacity of one or both corneæ. He described the means which had been adopted at Tantah school with a view to the improvement of the ophthalmic conditions described, dividing these into prophylactic and voluntary. Of the treated cases, 87.2% showed improvement at the end of the school year, as compared with their condition at the beginning. Of the untreated cases, 5.9% only showed improvement.

SYSTEMATIC REPORT OF THE PROGRESS OF OPHTHALMOLOGY IN THE THIRD AND FOURTH QUARTERS OF THE YEAR 1907.

By Dr. G. Abelsdorff, in Berlin; Prof. St. Bernheimer, in Innsbruck; Dr. O. Brecht, Prof. R. Greeff, Prof. C. Horstmann, and Dr. R. Schweigger, in Berlin; with the Assistance of Prof. A. Alling, New Haven; Prof. E. Berger, Paris; Prof. Cirincione, Genoa; Dr. Dalén, Stockholm; Prof. Hirschmann, Charcow; Dr. J. Jitta, Amsterdam; Mr. C. Devereux Marshall, London; Dr. H. Meyer, Brandenburg; Dr. P. von Mittelstädt, Metz; Dr. H. Schulz, Berlin; Prof. Da Gama Pinto, Lisbon; and Others.

Translated by Dr. Percy Fridenberg, New York.

Sections XIII.–XVIII. Reviewed by Staff Surgeon Dr. NICOLAI, Berlin.

XIII.—LENS.

349. Salzer, F. **Histological study of nematode-cataract (worm-cataract) of fishes.** *Arch. f. Augenheilk.*, lviii., 1, p. 19.

350. Magnus, G. **Pathological anatomy of congenital total cataract.** *Klin. Monatsbl. f. Augenheilk.*, xlv., 2, p. 51.

351. Isakowitz, J. **Case of lens defect; physiological proof of lens-centring.** *Arch. f. Augenheilk.*, lvii., 4, p. 291.

352. Fuchs. **Etiology of cataract.** *Rep. Ophth. Gesellsch.*, Heidelberg, 1906.

353. Fuchs. **Depression of posterior pole following cataract extraction.** *Clin. oculist.*, May, 1907.

354. Axenfeld. **Sclero-corneal reclination (scleronyxis anterior) after preliminary iridectomy.** *Ophth. Gesellsch.*, Heidelberg, 1907.

355. Weingartner. *Operative reclination of cataract.* Freiburg, 1906.

356. Koster, Gzn. **Removal of lens nucleus from vitreous seven years after dislocation.** *Nederl. Tydschrift voor Geneesk.*, 1907, No. 2, p. 5.

357. Guerin. **Expulsive hemorrhage after cataract extraction.** *Thèse de Bordeaux*, 1906–07.

358. Napp. **Bacteriology of conjunctiva after cataract extraction.** *Berl. Ophth. Gesellsch.*, May 16, 1907.

359. Baroggi. **Traumatic cataract.** *Clin. oculist.*, 1907, p. 2834.

360. Bistis. **Cataract after electric discharge.** *Zeitschrift f. Augenheilk.*, xvi., No. 6.

361. Viterbi and Foa, A. **Experimental diabetic cataract.** *Arch. di ottalm.*, April–June, 1907.

362. Hess, C. **Influence of ultra-violet light on the lens.** *Arch. f. Augenheilk.*, lvii., 3, p. 185.

363. Purtscher. **Uncommon form of complicated cataract.** *Arch. d'opht.*, xxvii., p. 227.

364. Peltzer, M. **Lens opacities; arteriosclerosis and iodosolvin.** *Fortschr. d. Med.*, xxv., 1907, p. 18.

365. Gradon, J. **Development of lens.** *Ophthalmoscope*, Sept., 1906, March, 1907.

Salzer (349, **Histological study of nematode-cataract [worm-cataract] of fishes**) examined diseased eyes of trout and found that opacities are caused by a suctorial worm which crawls beneath the lens capsule and eventually destroys the eye. Lens parasites have also been found in human eyes; recently by Greeff. The fish eyes showed characteristic burrows and nuclear fissures. The rôle of parasites should be borne in mind in complicated, Morgagnian, and chalky cataract, as well as in spontaneous clearing of opacities.

Magnus (350, **Pathological anatomy of congenital total cataract**) examined the freshly extracted uniformly opaque lenses of a child, free from all disease. The finding was that of a high degree of zonular cataract. At this early stage the picture is not obscured by degenerative changes.

Isakowitz (351, **Case of lens defect**) reports a case of congenital anomaly and considers the relation between ectopia lentis and total defect. Fœtal inflammation or remnants of fœtal disease must be the cause, as shown by the atrophic patches in the choroid, pigment proliferation, connective tissue striæ, vitreous opacities, and other fundus changes.

Fuchs (352, **Etiology of cataract**) discusses heterochromia, and the relationship of cyclitis and cataract to blue eyes and dark hair. This coloring is due to a crossing of races, and the question of its etiological significance is an open though important one.

Fuchs (353, **Depression of posterior pole following cataract extraction**) describes serous detachment of the choroid follow-

ing cataract extraction, due to tearing of the fibres of the pectinate ligament. The choroid may even be inverted by pressure of the orbital fat in case of the globe becoming soft after loss of aqueous, and may simulate detachment (Leber). Fuchs reports the unusual case of a highly myopic old man who showed these signs three days after extraction. Ophthalmoscopic examination revealed a scleral fold concentric with the disk, and three similar protrusions were found directly behind the iris, which became flatter as the anterior chamber was re-established and intraocular tension rose to normal. In this case the thinned sclera had yielded to the inward pressure of the orbital fat. CALDERARO.

KOSTER (356, **Removal of lens nucleus from vitreous seven years after dislocation**) operated seven years after the nucleus had been dislocated into the depths of the eye during cataract extraction. The operation was successful and symptoms of irritation subsided promptly. The original condition was one of lamellar cataract and high myopia. The nucleus afterward got into the anterior chamber and set up irritation for which it had to be removed. JITTA.

GUERIN (357, **Expulsive hemorrhage after cataract extraction**) reports cases and a histological examination which showed some dilatation of choroidal veins but no lesions of the vessel walls. Arterial pressure was often found increased without a corresponding rise in external pressure. Arteriosclerosis is a counterindication to cataract extraction.

BERGER.

NAPP (358, **Bacteriology of conjunctiva after cataract extraction**) studied the effect of an aseptic dressing after operation. It does not appear to interfere with wound healing but does not prevent multiplication of bacteria, or their development in a previously germ-free conjunctival sac. Conjunctivitis may be mainly traumatic, and due to some rough handling as with fixation forceps, or constitutional.

BAROGGI (359, **Traumatic cataract**) reports on 80 cases from the clinic in Pavia. Fifty were complicated in some way, and 4 were infected. Iridectomy is indicated in all these cases, and extraction is advisable even in children. It is a mistake to wait for absorption.

BISTIS (360, **Cataract after electric discharge**) reports a case

of lens opacity following electric discharge which showed a progressive course. The changes are probably due to mechanical vibration of excessive degree and possibly to consecutive trophic disturbances.

Viterbi and Foa (361, **Experimental diabetic cataract**) introduced powdered glucose into the conjunctival sac, and injected solutions into the anterior chamber, and the peripheral circulation. The results were uniformly negative. Glucose is not absorbed by the lens unless injected under high pressure or after the ciliary epithelium has been altered by disease, as after injections of sodium fluoride. Then even small doses of glucose injected at low pressure will cause cataract, which is not due to simple osmosis but to chemical and vital influences. Calderaro.

Hess (362, **Influence of ultra-violet light on the lens**) used the new mercury lamp of Schott (uviol light), and tested its action on frogs, guinea-pigs, and rabbits. The degenerative and regenerative changes are limited to the epithelial cells and the lens fibres are not affected. The relations to glass-blower's cataract and that due to lightning are considered.

Purtscher (363, **Uncommon form of complicated cataract**) reports four cases of cortical or total cataract in patients of about thirty, associated with a thinned sclera, deep anterior chamber, muddy, discolored iris, congenital ectropion of the uveal pigment layer at the pupillary margin of the iris, and unequal and contracted pupils. Iridodonesis and fluid vitreous were also noted, with predisposition to glaucoma, cyclitis, or detachment, particularly after extraction. Iridectomy should always be performed in these cases, which appear to show a relation between developmental anomalies of the uveal tract and the development of cataract. Berger.

Gradon (365, **Development of lens**) has made researches in comparative ocular embryology, but chiefly on two changes taking place in the later developmental stages in the lenses of eyes that are normally adjusted for distant vision when at rest, and the absence of one of these changes and a variation of the other in the lenses of eyes that are adjusted for near vision, *e. g.*, those of the mouse, the chick, and the frog:

1. The formation of a lymph space round the equator of the lens between the anterior and posterior walls, which,

contrary to the accepted view, never fuse during development though the forward growth of the hinder wall speedily obliterates the central cavity.

2. A coincident flattening of the anterior surface of the lens by traction which is produced by developmental increase in the equatorial diameter of the eye.

In eyes which are adjusted for near vision, *e. g.*, those of the trout and dogfish, no flattening takes place and the lymph space is formed over the anterior third of the fully extended hind wall between it and the anterior wall.

The author holds that during development a flattening of the anterior surface of the lens takes place in eyes adjusted for distant vision when at rest. This is absent in the globular eye of the trout.

With regard to the lymph space that forms round the equator of the lens—in the mouse between birth and the seventh day after, in the chick on the eighth day of incubation, and in the frog when it is about 11.5*mm* in body length and has just lost its tail—the author believes that excessive accommodation, especially under hypermetropic conditions, would mean partial or complete closure of this space and consequent and proportionate lack of nutrition for the very large number of cells belonging to the outer zone of the hind wall that terminate anteriorly to it. This seems to explain why Schön[1] and others have found that cataract, heretofore distinguished as "senile," but which Schön, in consequence of his investigations, wishes to be known as "simplex," always begins as equatorial, can frequently be found in its incipiency in young people of twenty to thirty years of age, and that three-fourths of the total number of cataractous eyes are hypermetropic or astigmatic.

The second article is illustrated with drawings of the developing lens of the tadpole and trout, and should be read by those interested in the development of the eye.

T. Harrison Butler.

XIV.—IRIS.

366. Terrien and Cantonnet. **Corpuscular elements of the blood and etiologic diagnosis of iritis.** *Soc. franç. d'opht.*, May, 1907.

[1] Dr. Schön, "The Cause of Senile Cataract," Archives of Ophthalmology, 1889, vol. xviii., p. 322.

367. DE MICAS. **Iritis and mumps.** *Rec. d'opht.*, xxix., p. 413.
368. OHM. **Unilateral reflex pupillary paralysis due to orbital injury.** *Centralbl. f. prakt. Augenheilk.*, xxxi., p. 193.
369. COPPEZ, H. **Mydriasis changing to meiosis on inclining the head.** *Soc. belge d'opht.*, Nov. 25, 1906.
370. TRANTAS. **Ophthalmoscopy of ciliary region.** *Report* XXIV. annual meeting *Soc. franç. d'opht.*
371. BERGMEISTER, O. **Chip of steel in the iris for ten years without causing irritation.** *Centralbl. f. prakt. Augenheilk.*, xxxi., Sept.

TERRIEN and CANTONNET (366, **Corpuscular elements of the blood and etiologic diagnosis of iritis**) found diminution of red blood cells, or leucocytosis, particularly of the polynuclears. These examinations are of importance as the iritis is often the expression of a general affection.

DE MICAS (367, **Iritis and mumps**) notes a case in a man of twenty-one. The ocular affection was bilateral, and was finally cured with reduction of vision to $\frac{2}{3}$. Iritis may complicate or follow mumps, and presents no characteristic clinical picture. It is frequently associated with orchitis, and may present facial paralysis. BERGER.

OHM (368, **Unilateral reflex pupillary paralysis due to orbital injury**) reports a case of this condition with maintained convergence after entrance of a piece of steel into the orbit, causing direct injury to the oculomotor. No cerebral lesion could well be assumed. It is difficult to explain the lesion of the ciliary nerves. There was partial anæsthesia of the cornea, further involving the question. The innervation of the iris seems to be very complicated.

COPPEZ (369, **Mydriasis changing to meiosis on inclining the head**) reports the case of a girl of nineteen with contraction of the left pupil, associated with severe pain in the eye on inclining the head forward. On lifting the head up again the meiosis persisted for about ten seconds, and then became normal after thirty-five seconds. The patient had mediastinal polyadenitis with displacement of the aorta to the left. Coppez believes that inclination of the head by contracting the sterno-cleido mastoid caused the enlarged glands to press on the cervical sympathetic, and so caused pupillary changes.
BERGER.

TRANTAS (370, **Ophthalmoscopy of ciliary region**) presses on the region of the ciliary body with the finger, allowing

fundus changes to be studied as far forward as the ora serrata, and explaining certain forms of peripheral contraction of the visual fields. BERGER.

BERGMEISTER (371, **Chip of steel in the iris for ten years without causing irritation**) reports a case of injury during fencing, in which the foreign body appeared after ten years and was extracted. Siderosis had not developed as the foreign body was encapsulated successfully and firmly fixed. It weighed a bit less than *1mg.*

XV.—CHOROID.

372. ROCHON-DUVIGNEAUD. **Ophthalmoscopic pictures and anatomical lesions.** *Soc. d'opht. de Paris,* July 2, 1907.

373. KRAUSS, W., and BRUECKNER, A. **Tuberculosis of the fundus oculi.** *Arch. f. Augenheilk.,* lvii., No. 3, p. 157.

374. WEEKS, J. E. **Case of endothelioma of the choroid.** *Ophth. Record,* April, 1907.

375. BULL, C. S. **Rare forms of choroiditis.** *Med. Record,* May 4, 1907.

ROCHON-DUVIGNEAUD (372, **Ophthalmoscopic pictures and anatomical lesions**) found different anatomical changes in two cases of atrophic patches of the choroid. In one there was an atrophic adhesion of choroid and retina with marginal proliferation of retinal pigment. In the other, a case of chorio-retinitis pigmentosa, there was atrophy of the retina with loss of pigment in the epithelial pigment layer, and diffuse infiltration of pigment in the other layers.

BERGER.

KRAUSS and BRUECKNER (373, **Tuberculosis of the fundus oculi**) report two cases in young adult males. Family history, clinical course, and tuberculin reaction proved the nature of the peculiar unilateral eye affection, involving choroid, retina, and vitreous, and progressing with marked involvement of vision but no pain. The retina was detached by a solid mass, and surrounding this there was a white patch and numerous small, gray nodules. There were numerous hemorrhages but little pigment proliferation, showing that there was slight involvement of the choroid, a rather unusual condition.

WEEKS'S (374, **Case of endothelioma of the choroid**) patient was a woman sixty-two years old. Six months before coming

under observation the left eye became red and painful. Transillumination with Sachs's lamp confirmed suspicion of a tumor in the ciliary zone. The enucleated eye showed the growth involving the choroid and ciliary body. Microscopically it was seen to have its origin in the layer of large vessels in the choroid. The cells, chiefly of the round and spindle shaped type, with some epithelial cells, were arranged in irregular alveoli. BLAKE.

BULL (375, **Rare forms of choroiditis**) says that in the posterior uveitis due to malaria and auto-intoxication the microorganisms are conveyed to the eye from some other part of the body by the blood. Malaria may produce inflammation of the entire uvea, with periodical attacks and a tendency to relapse. Characteristic of the choroiditis are small yellowish patches of exudation, fairly circular in outline, but very little elevated, without tendency to coalesce and scattered over the fundus.

Auto-intoxication produces conjunctival injection, paralysis of accommodation, mydriasis, and choroiditis with yellow-white exudations of various shapes and sizes, very flat, scattered over the fundus. No pigment masses or hemorrhages were seen. BLAKE.

XVI.—VITREOUS.

376. WOLFRUM. **Development and normal structure of vitreous.** *v. Graefe's Arch. f. Ophth.*, xlv., No. 2, p. 220.

377. POSSEK, R. **Antigenetic action of vitreous.** *Klin. Monatsbl. f. Augenheilk.*, xlv., No. 1, p. 329.

378. MILLIKEN. **Hemorrhage into the vitreous.** *Ohio State Med. Journ.*, Nov., 1906.

379. CRAMER, E. **Surgical cure of circumscribed abscess of vitreous.** *Centralbl. f. prakt. Augenheilk.*, June, 1907.

380. ZIMMERMANN. **Discission of vitreous strands in traumatic detachment of retina.** *Klin. Monatsbl. f. Augenheilk.*, xlv., No. 2, p. 192.

WOLFRUM (376, **Development and normal structure of vitreous**) notes the ectodermal character of this tissue and its origin from the retina, at first as a primitive vitreous from Mueller's supporting fibres, later by means of cross anastomoses of radiating fibres of the retina. The lens plays no rôle, and the vascular system merely nourishes this tissue. The limitans interna belongs to the retina and to the vitreous.

Possek (377, **Antigenetic action of vitreous**) finds that the vitreous has receptors of the second order; an immune serum precipitating in homologous and heterologous vitreous and in homologous blood serum, and contains hemolytic amboceptors.

Cramer (379, **Surgical cure of circumscribed abscess of vitreous**) noted this condition, in the form of an encapsulated mass following injury by a percussion cap. Incision from the sclera in deep narcosis evacuated a quantity of pus, but no foreign body, and recovery took place with full vision. The inflammation was probably purely chemical, and it remains to be seen whether the foreign body will remain encapsulated in the interior without causing further damage to the eye.

Zimmermann (380, **Discission of vitreous strands in traumatic detachment of retina**) noted detachment of the retina after penetration of the globe by a foreign body which was removed with the magnet. A number of connective-tissue strands developed in the interior which were severed without injury to the lens, after which the detachment flattened out, and the subretinal exudate was absorbed, leaving a scar. After this successful operation the eye remained well.

XVII.—GLAUCOMA.

381. Erdmann, P. **Experimental glaucoma.** *Ophth. Gesellsch. Heidelb.*, 1906.

382. de Vries, W. M. **Sclerosis of sclero-corneal reticulum in glaucoma.** *Ned. Tydschr. v. Geneesk.*, 1907, No. 1, p. 24.

383. Dufour. **Transient hypertension.** *Soc. franç. d'opht.*, May, 1907.

384. Holth, S. **Iridencleisis antiglaucomatosa.** *Annales d'oculistique*, cxxxvii., p. 345.

385. Dolganow, W. **Cyclodialysis (Heine) in acute absolute glaucoma.** *Praktit. Wratch.*, 1907, No. 31.

386. Krauss. **On cyclodialysis.** *Zeitschrift f. Augenheilk.*, xvii., p. 318.

387. Weekers. **Cyclodialysis (Heine) in operative treatment of glaucoma.** *Klin. Monatsbl. f. Augenheilk.*, xlv., No. 2, p. 232.

388. v. Hippel, A. **Value of iridectomy in simple glaucoma.** *Klin. Monatsbl. f. Augenheilk.*, xlv., No. 2, p. 58.

389. Bjerrum, J. **Treatment of glaucoma.** *Centralb. f. prakt. Augenheilk.*, xxxi., Aug., 1907.

390. DE SCHWEINITZ, G. **Acute rise of tension following a single subconjunctival injection.** *Ophthalm. Record*, April, 1907.

391. BULL, C. S. **Post-operative history of sixty cases of simple chronic glaucoma.** *Ophth. Record*, June, 1907.

392. HENDERSON, T. **Pathogenesis and treatment of glaucoma.** *Ophth. Rev.*, Sept., 1907.

393. LAWFORD, J. **Hereditary primary glaucoma.** *R. Lond. Ophth. Hosp. Reports*, March, 1907.

ERDMANN (381, **Experimental glaucoma**) used electrolysis as a means of producing inflammatory obliteration of the tissues at the filtration angle. In 75% of the cases he was able to produce actual and lasting plus tension with its usual sequelæ in rabbits' eyes. The obliteration at the iris angle was brought about by a deposit of metallic iron in a finely granular state. The appearance of the eyes was very much like that in infantile glaucoma, with enlargement of the anterior segment of the globe, buphthalmos, flattening of the cornea, tears of Descemet's membrane, atrophy of retina and choroid, and glaucomatous excavation. Puncture of the anterior chamber of these eyes caused detachment and hemorrhage. The effect of meiotics and mydriatics, secretion of fluorescin, and the albumin content of the aqueous was tested in these eyes.

DE VRIES (382, **Sclerosis of sclero-corneal reticulum in glaucoma**). This condition of the pectinate ligament is much less frequent a cause of plus tension than actual obstruction of the filtration angle, yet it is of importance. In his case there was partial atrophy of the endothelium of the reticulum, and a consequent gluing together of the lamellæ. Such changes may be due to inflammatory agents. JITTA.

DUFOUR (383, **Transient hypertension**) notes that increased intraocular pressure may affect even normal eyes at night, in consequence of darkness, rest, and incidental mydriasis, as well as of pressure on the vessels of the neck. Conjunctivitis sicca is probably another result of this condition. This disposition may be more marked in some eyes, hence the frequency of a nocturnal onset of acute glaucoma.

BERGER.

HOLTH (384, **Iridencleisis antiglaucomatosa**) observed good results in iridectomy for glaucoma which had been followed by incarceration of the iris and the development of a filtration

cicatrix, and bases his operation on artificial incarceration. To prevent infection the inverted iris is covered with a conjunctival flap. In 11 cases, previously operated on by iridectomy, and twenty-one combined operations, and in 9 cases with irodotomy, the results were good, tension generally being reduced to normal. Vollert reported 4 successful cases. BERGER.

DOLGANOW (385, **Cyclodialysis [Heine] in acute absolute glaucoma**) performed Heine's operation in 12 cases. In 11 the result was brilliant. Pain disappeared in three or four hours, and tension was reduced for the entire period of observation (two weeks to three months). In one case only, pain persisted and the eye finally had to be enucleated. The operation is technically simple but painful. Hemorrhage into the anterior chamber is not a serious complication and disappears completely in from seven to ten days. The after-treatment is short, and the patients do not have to be interned. HIRSCHMANN.

KRAUSS (386, **On cyclodialysis**) claims that Heine's operation does not establish a permanent communication between the anterior chamber and the suprachoroidal space. The procedure is of doubtful value, and the old established operations are to be advised in its stead.

WEEKERS (387, **Cyclodialysis [Heine] in operative treatment of glaucoma**) reports five cases, and one histological examination. The procedure is dangerous in hemorrhagic glaucoma, and often barren of result in chronic cases. It is too early to form a definite judgment of the value of the operation, but it is disappointing in the protracted cases.

v. HIPPEL (388, **Value of iridectomy in simple glaucoma**) reports 74 eyes operated, 65 iridectomies, 6 sclerotomies, and 3 combined operations (iridectomy followed by sclerotomy). After at least two years without deterioration, he notes 41% of cures, 14% provisional cures, 26% gradual deterioration, 20% gradual blindness. Early iridectomy is the sovereign remedy.

BJERRUM (389, **Treatment of glaucoma**) reports 5 cases of buphthalmos and 14 of glaucoma treated by modified sclerectomy. Graefe's knife is introduced *2mm* from the cornea and carried forward as far as the anterior chamber

so that the peripheral counterpuncture can be carefully observed. The section ends under the conjunctiva. The operation is recommended for buphthalmos and simple glaucoma.

DE SCHWEINITZ (390, **Acute rise of tension following a single subconjunctival injection**) reports the case of a man, twenty-nine, with a marked uveitis, in whom the subconjunctival injection of ten minims of a 1 : 5000 solution of cyanid of mercury induced an attack of acute glaucoma, with tension plus two, lasting for five hours. Previous to this occurrence ten injections of normal saline had been made, and many thereafter, with none but beneficial effects. BLAKE.

BULL'S (391, **Post-operative history of sixty cases of simple chronic glaucoma**) second series includes 60 cases. The operation was iridectomy in all cases and 115 eyes were operated upon. The age varied from thirty-seven to seventy-eight; 55% were women, all were native-born Americans, and the existing refraction in all cases was hyperopic. The results of the operation were as follows: Temporary improvement of central vision in fourteen eyes, but no permanent improvement in any case. No impairment of central vision in any eye. Slow but steady failure of central vision in 70%. Immediate diminution of tension in 112 eyes and permanent diminution for a period of six to eleven years in twenty-four eyes. No apparent effect on tension in three eyes. No immediate increase in narrowing of field in any case. Slow but steady diminution of field in ninety-two eyes. Absolute glaucoma in sixteen eyes. An apparent arrest of progress of disease in twenty-one eyes. BLAKE.

HENDERSON, T. (392, **Pathogenesis and treatment of glaucoma**) contributes a convincing article on the causation of glaucoma; his theory is most ingenious, and, assuming the correctness of his histological findings, the pathological alterations that he describes must of necessity have an intimate causal relationship to the clinical features of the disease. According to Henderson, the underlying predisposing and causal factor of glaucoma is a primary obstruction and closure of the spaces in the pectinate ligament.

The *pectinate ligament* is at birth composed of a fine stroma of cells forming a delicate network on the inner side

of Schlemm's canal. As years go on the connective-tissue cells of these trabeculæ undergo fibrosis, a purely physiological process. At the same time the endothelial cells of the alveoli lay down a homogeneous membrane just as Descemet's membrane is laid down. A further cause for fibrosis is the dragging of the ciliary muscle, which is most marked in hyperopic eyes.

These processes give the key to the origin of glaucoma. The obstruction to the egress of intraocular fluid is brought about by the closing of the interspaces of the pectinate ligament by fibrosis and the formation of a membrane round its bundles.

The *iris* is not only an optical diaphragm, it is an absorbing surface, and in conjunction with the canal of Schlemm carries off the aqueous from the eye.

The *aqueous* is not a secretion but a transudate, whose amount depends upon arterial blood pressure. The balance between secretion and outflow through the pectinate ligament and the crypts of the iris is disturbed in glaucoma by the changes above mentioned which throw all the work upon the iris. The iris drainage area varies inversely with the area of the pupil, but even more important is the fact that when the pupil dilates the crypts close.

Acute glaucoma is precipitated by mydriasis, and by conditions which raise the local blood pressure in an eye predisposed to glaucoma,—an eye whose pectinate ligament is wholly or partially occluded. The raised tension causes venous obstruction, and a swollen iris. Thus the iris root is forced against the pectinate ligament. The blocked angle of the chamber is the *result*, not the *cause* of the raised tension. The pressure on the vorticose veins causes congestion of the ciliary bodies, relaxation of the zonule of Zinn, and a globular lens, and so determines a shallow anterior chamber.

Treatment.—As Henderson has shown in another paper abstracted in this journal, iridectomy opens up fresh drainage areas in the iris, and so relieves the obstructed outflow.

If all Henderson's views be correct we should not make a wide iridectomy, but three or four narrow iridectomies; it would also be quite unnecessary for these operations to be peripheral. My own experience has been that a narrow non-

peripheral iridectomy is just as efficient as a wide peripheral one, but such a view is quite contrary to all the canons of the art of ophthalmology. T. Harrison Butler.

Lawford (393, **Hereditary primary glaucoma**) has in this paper set forth the family history of five cases of hereditary glaucoma which have come under his notice. The families are analyzed in graphic form. The occurrence in more than one member of a childship, or in more than one generation of a family, has been noticed by many writers, but the number of reliable glaucoma pedigrees is not large. In 1869 von Graefe emphasized the importance of inheritance in the causation of glaucoma. His opinion was that hereditary influence seemed to predominate in typical inflammatory glaucoma, which often attacks siblings.

The records since von Graefe's time seem to show that hereditary glaucoma is more likely to assume the chronic than the acute form. Von Graefe recognized the tendency to "anticipation" in hereditary glaucoma. The symptoms which in the grandparents of a glaucoma family appeared at fifty or sixty may in the grandchildren commence at thirty or forty. Von Graefe in such cases noticed an unusually long prodromal stage extending over ten to fifteen years.

Lawford sums up the results of his acquaintance with *hereditary* glaucoma.

"Anticipation" is usually a marked feature. The disease usually, but by no means always, appears in the chronic form. The liability to transmission by the two sexes is roughly equal. The male sex shows a slightly greater liability to inheritance. T. Harrison Butler.

XVIII.—SYMPATHETIC OPHTHALMIA.

394. Kitamura, S. **Histological study of sympathetic inflammation.** *Klin. Monatsbl. f. Augenheilk.*, xlv., 1907.

395. Sulzer. **Sympathetic ophthalmia thirty-seven years after injury.** *Annales d'oculistique*, cxxxvii., p. 141.

Kitamura (394, **Histological study of sympathetic inflammation**) gives the results of examination of twelve globes. In 577 cases of penetrating wound of the cornea, and in 5 of corneal ulcer, there was a total of 23 cases of sympathetic inflammation. The uvea was invariably in-

volved, beginning with the iris and extending to the ciliary body and choroid. Uveitis of a severe type may follow injury without any ascertainable perforation or solution of continuity in the injured eye. The clinical picture presents corneal opacities, posterior synechiæ, ciliary injection, and deposits on Descemet's membrane.

Sulzer (395, **Sympathetic ophthalmia thirty-seven years after injury**) observed this condition in a man of forty. Phthisis bulbi had followed perforating injury with scissors at the age of three. The symptoms developing in the other eye were those of plastic iritis with vitreous opacities, and rapid loss of sight, vision being reduced to counting fingers at 3½ metres. Subconjunctival injections of oxy-cyanide of mercury, and instillations of atropin resulted in recovery with good vision. In the discussion, Dupuy-Dutemps cast doubt on the sympathetic nature of the attack, while Terson considered the possibility of mild forms of sympathetic ophthalmia which may go on to recovery without enucleation of the exciting eye. Berger.

Sections XIX.–XXII. Reviewed by Dr. H. MEYER, Brandenburg.

XIX.—RETINA AND FUNCTIONAL DISTURBANCES.

396. Sachs, M. **New procedure for the relief of retinal detachment.** *Wiener klin. Wochenschrift*, 1907, p. 1309.

397. Zimmerman, W. **Discission of vitreous strands in traumatic retinal detachment.** *Klin. Monatsbl. f. prakt. Augenheilk.*, xlv., No. 2, p. 192.

398. Freytag, G. **Pressure bandage in treatment of retinal detachment.** *Muenchn. med. Wochenschrift*, 1907, p. 1735.

399. Fejér. **Treatment of embolism of central retinal artery.** *Centralbl. f. Augenheilk.*, xxxi., p. 231.

400. Krauss, F. **Embolism of the cilio-retinal artery.** *Ophth. Record*, April, 1907.

401. Coats, G. **Pathology of macular holes.** *R. Lond. Ophth. Hosp. Reports*, March, 1907.

402. Gradle, H. **Further observations on retinitis punctata.** *Journ. Am. Med. Assn.*, July, 27, 1907.

403. Cohen, M., and Dixon, G. S. **Amaurotic family idiocy. Histological report.** *Journ. Am. Med. Assn.*, May 25, 1907.

404. Hancock, I. **Head-nodding and nystagmus.** *R. London Ophth. Hosp. Reports*, March, 1907.

405. VAN DUYSE. **Three cases of family retinitis (punctata albescens.)** *Arch. d'opht.*, xxvii., p. 497.

406. RADCLIFFE and GOLDBERG. **Extreme case of glioma retinæ.** ARCH. OF OPHTH., xxxvi., No. 2, p. 223.

SACHS (396, **New procedure for the relief of retinal detachment**) punctures the wall of the globe at various points along the equator in order to let off the subretinal exudate and cause an attachment between retina and choroid by adhesions. He believes that purely mechanical factors will produce a permanent result by the influence of the exuded fluid on the retina. Operative results in four cases were encouraging.

ZIMMERMAN (397, **Dicission of vitreous strands in traumatic retinal detachment**) saw a patient with a chip of iron in the interior of the globe which was removed with the magnet. Connective-tissue strands formed in the vitreous and led to mechanical detachment of the retina by traction. This flat detachment disappeared as soon as the strands had been divided from above with a Graefe knife. The cure appears to be complete and lasting, and $V = \frac{5}{15}$.

FREYTAG (398, **Pressure bandage in treatment of retinal detachment**) goes on the principle that fluids in vessels or cavities when under pressure exert an even pressure on every part of the containing wall. Equal hydrostatic pressure on the vitreous and subretinal exudate can cause decrease in the latter only in the measure that the fluid in the vitreous diminishes. This leaves out of consideration the fact that the exudate between retina and choroid absorbs at a different rate from the free fluid in the vitreous. If the pressure bandage is removed the hydrostatic pressure does not remain steady, the eye has a tendency to resume the spherical form, and the tendency already present for an increase of subretinal fluid is added to by this factor. There is no means of foretelling which cases will heal spontaneously, and which will be cured by the pressure bandage.

FEJÉR (399, **Treatment of embolism of central retinal artery**) cured a case of this sort by circular massage in two months. He takes exception, on pathological and histological grounds, to Schapringer's theory of the development of embolism.

Krauss (400, **Embolism of the cilio-retinal artery**) noted an embolism of a large cilio-retinal artery in a girl. Owing to collateral circulation a normal condition of the fundus was re-established. Blake.

Coats (401, **Pathology of macular holes**) in a very able paper summarizes the literature of the subject, and then gives an account of four eyes which were found after enucleation and hardening to show changes which would probably have given the ophthalmoscopic appearance of a macular hole. A macular hole is usually the result of a contusion of the globe. It consists of a circular, sharply circumscribed spot measuring one-third to one-half the diameter of the disk. It is situated exactly in the fovea, and the surrounding retina is slightly opaque. The floor is of a clear dark red color, often stippled with small yellow spots. It is slightly depressed below the general retinal level, but the depth is seldom enough to be measured by the ophthalmoscope. The appearance is permanent, and has been seen in typical form forty-three years after the accident. The first unequivocal description of a macular hole is by Noyes (*Trans. Amer. Ophth. Soc.*, 1871, p. 128) and to him and not to Kuhnt or Haab must the first discovery be ascribed. Since Noyes's paper appeared a considerable mass of literature has been collected. Reis in discussing his own cases, and those reported by others, very properly says, that since the same appearance may be found after a contusion as after morbid conditions—especially irido-cyclitis and retinal vascular disease—it is necessary to presume a common pathological factor. He suggests the theory, already foreshadowed by Fuchs, that retinal œdema is the underlying lesion. This is opposed to Menteith Ogilvie's supposition that the hole is a tear by contre-coup. Against the latter theory must be urged the fact that a hole has never been seen sooner than sixty hours after the blow. Up to the present no case has been observed clinically and examined pathologically.

Coats's first case, a girl aged sixteen, was seen at the Royal London Ophthalmic Hospital by Mr. Flemming on May 16, 1905. On Feb. 27, 1905, the right eye had been injured by a gunpowder explosion. V = no p. l., fundus not visible, eye much disorganized. Eye removed and hardened in formol.

With the naked eye a dark spot is visible at the macula, with the loup an almond-shaped depression is seen $\frac{1}{3}$ P. D. in size. There is a flat detached retina and a swollen disk. The fovea is shown in a microphotograph. Microscopically the case resembled one described by Fuchs. In addition to changes in the retina surrounding the fovea—cystic spaces in the nerve-fibre and ganglion-cell layers, and in the intergranular layer—the fovea itself is occupied by two large cystic cavities, separated by a thin septum. These spaces are bounded by the limitans interna alone towards the vitreous. Externally they are bounded by the much thinned and scattered external nuclear layer.

The second case was discovered accidentally in a microscopical specimen. After an extraction, the eye was lost from irido-cyclitis. It was enucleated four and a half months after operation. The eye was myopic. Cystic spaces were found in the retina close to the macula. At the macula itself the retina was completely absent. There was no evidence of injury, but Coats thinks the gap in the retina may have been the result of stretching of the whole retina due to the myopia. This fundus must have showed a typical hole could it have been examined ophthalmoscopically.

The third case was one of chronic irido-cyclitis which eventually resulted in cataract and amaurosis. The condition found at the macula somewhat resembled that in Case 1. There was extreme cystic degeneration of the whole posterior pole of the retina, the fovea was occupied by two large cystic spaces separated by a partial partition of supporting tissue. The cones were quite absent at the fovea. Some tubercle-like pustules were found in the peripheral part of the retina, but the case was not regarded as tubercular.

The fourth case is one of rupture of the retina, the result of a blow on the eye. A small tear of the retina was discovered in the hardened eye exactly across the fovea. There can be no doubt that it was a rupture by contre-coup, the direct and immediate result of the injury.

Coats arrives at the following conclusions: Macular holes are produced by œdema of the retina at the posterior pole. This œdema may not be confined to the macula, but the appearance of a hole will only be produced if there be a defect

at least of the inner layers of the retina. The œdema may result from a contusion, in which case it is the same as the œdema which produces Berlin's opacity; or it may arise from toxins in the vitreous, the result of irido-cyclitis; or from retinal vascular disease. Rupture of the retina at the time of injury is *not* the cause of macular holes.

Since Coats's paper appeared Twietmeyer has published two cases in which opacity of the macula was ophthalmoscopically observed some time before the hole was seen (*Zeitschrift für Augenheilkunde*, Nov., 1907).

T. Harrison Butler.

Gradle (402, **Further observations on retinitis punctata**) makes the following classification: 1. Simple punctate retinitis in which there are no complications. The spots are few in number and occur near the disc, one eye being usually more involved than the other. Hygienic treatment has cured cases observed by the author. The spots described by Gunn are probably of this variety. 2. The form which is associated with optic neuritis. He records two instances. 3. As a part of retinal disease. In these cases the spots appear late in the course of retinal inflammation but persist. 4. Associated with retinitis albuminurica. 5. With choroidal disease the spots may be primary or secondary. 6. Atypical retinitis pigmentosa. Cases resembling retinitis pigmentosa but not showing characteristic retinal pigment disturbance at the periphery. The greater part of the field is studded with minute dull white spots. Alling.

Cohen and Dixon (403, **Amaurotic family idiocy. Histological report**) assent to the opinion that this disease is one of degeneration of the ganglion cells of the entire nervous system, the retinal and optic nerve changes being only the ocular manifestations of the general lesion. Microscopic section of the eye showed swelling of the multipolar ganglion cells, displacement of their nuclei, occasional disappearance of the ganglion cells, and general disappearance of Nissl's bodies and simple atrophy of the optic nerve. The eyes were hardened two hours after death. Blake.

Hancock (404, **Head-nodding and nystagmus**). There are two distinct groups of cases: (1) Cases of so-called "spasmus nutans," a disorder of infants associated with nystagmus.

(2) Cases of congenital head-nodding and nystagmus which may be a family disease.

Group 1. Spasmus nutans. The nodding may be antero-posterior, rotatory, or lateral. The nodding may be an early and transitory symptom of the disease, and nystagmus alone may be present when the patient is first seen. The nystagmus may be vertical, lateral, or rotatory; it is as a rule bilateral. The disorder is one of infancy, the time of onset varying from the fourth to the twelfth month; the patients are more usually females than males. The fundi and media are generally normal, and the refraction hyperopia. Vision is generally good. The disease has been causally associated with rickets, dentition, traumatism, gastro-intestinal irritation, with a neuropathic history and with living in dark rooms. Hancock discusses these factors, and draws attention to the possible connection of the disease with irritation of the semicircular canals. The disease disappears as the child grows older.

Group 2. Congenital head-nodding and nystagmus. These cases are often confused with those of spasmus nutans. There are, however, very distinct differences in the symptoms, which the author classifies as follows:

1. The symptoms date from birth; those of spasmus nutans have never been known to commence before the sixth week.

2. The symptoms persist through life, whereas spasmus nutans always disappears.

3. They are all very amblyopic, whereas in spasmus nutans the vision is good.

The paper does not contain anything very new and nothing is said about treatment of either type.

T. Harrison Butler.

van Duyse (405, **Three cases of family retinitis punctata albescens**) reports three cases of this interesting condition in which there was marked heredity and an alternation of healthy and diseased children. Vascular disease is the basis of the choroidal affection and of that of the external or deeper layers of the retina, and is probably due to a congenital dyscrasia of the blood.

Radcliffe and Goldberg (406, **Extreme case of glioma**

retinæ) had made a timely diagnosis. Enucleation was not performed until seven months later, however, as permission for operation was refused. In the terminal stage there was exophthalmos with extensive hemorrhages, and plus tension. The growth showed various stages of degeneration and filled the vitreous completely, having invaded retina, optic nerve, and lens. The anterior chamber was filled with an exudation. Some vessels were found in which the lumen was bounded by neuroglia cells. The nuclei, in a state of granular degeneration, all lay at the central end of the cell, *i. e.*, toward the lumen of the vessels. Two months after operation the little patient died of metastases in the liver.

XX.—OPTIC NERVE.

407. Sattler, C. H. **Pathological pigmentation of the nerve-head.** *Arch. f. Augenheilk.*, lviii., p. 126.

408. Casali, A. **Orbital injury with penetration of cranial cavity. Hematoma of nerve sheath.** *Ann. di ottalm.*, xxxvi., Nos. 1–2, p. 128.

Sattler (407, **Pathological pigmentation of the nerve-head**) adds to Ogawa's seven cases one in a girl of fifteen years with amaurosis of the right eye. The disc was pale, vessels narrow, the outer third of the nerve-head covered by an accumulation of pigment. Nothing could be seen of the lamina cribrosa. The picture makes the impression of hematogenous pigmentation following a hemorrhage into the nerve or its sheaths after injury. The scar in the temple could still be seen.

Casali (408, **Orbital injury with penetration of cranial cavity**) reports the case of a boy of eleven who ran a steel rib of an umbrella into his eye with such force that he fainted. Examination showed a transverse wound of the upper lid, chemosis of the lower lid, exophthalmos and complete immobility of the globe, mydriasis, and complete loss of vision. Fever developed with vomiting, athetosis, and tonic-clonic contractions of the extremities, and in the left eye the disc was œdematous and the veins engorged. Death took place in three days. Post-mortem examination showed a vertical tear in the dura on the anterior surface of the sella turcica, with some coagulum, and a probe could be passed from the wound through

the fissure in the sphenoid into the orbital cavity. There was extensive laceration of brain tissue with hemorrhages and commencing inflammation. There was a hemorrhage into the subdural sheath of the optic nerve. The lower part of the disc was swollen and the lamina cribrosa pushed forward. No hemorrhages about the disc or in the retina.

CALDERARO.

XXI.—INJURIES, FOREIGN BODIES, PARASITES.

409. BERGMEISTER, O. **Steel chip in the iris for ten years.** *Centralbl. f. Augenheilk.*, xxxi., p. 257.

410. ULBRICH, H. **Gun-shot wounds of the orbit.** *Arch. f. Augenheilk.*, lviii., p. 12.

411. MAYWEG, W. **Tetanus following injury of the globe.** *Klin. Monatsbl. f. Augenheilk.*, xlv., No. 2, p. 204.

412. PINCUS, FR. **Spontaneous recovery from traumatic pulsating exophthalmos.** *Zeitschrift f. Augenheilk.*, xviii., p. 33.

413. OHM, J. **Unilateral reflex pupillary paralysis due to orbital injury.** *Centralbl. f. Augenheilk.*, xxxi., p. 193.

414. ZIMMERMAN, W. **Bullet wound of orbit. Removal of bullet (Kroenlein).** *Klin. Monatsbl. f. Augenheilk.*, xlv., No. 2, p. 195.

415. PAPAIVANNON, T. **Echinococcus of optic nerve.** *Deutsche med. Wochenschrift*, 1907, p. 1635.

416. SALZER, F. **Histological study of worm-cataract of fishes.** *Arch. f. Augenheilk.*, lviii., p. 19.

417. THOMSON, E. and BUCHANAN, L. **Injury to the eyes of the child during labor.** *Ophthalmoscope*, April, August, 1907.

BERGMEISTER'S (409, **Steel chip in the iris for ten years**) patient had carried the foreign body for ten years without signs of local irritation. In attempting to remove it, the foreign body had been lost to sight and reappeared later on the anterior surface of the iris, having wandered.

ULBRICH (410, **Gun-shot wounds of the orbit**) noted the development of pigment degeneration in a few days, as observed by Wagenmann after experimental injury of the posterior ciliary vessels in rabbits. In the second case there was a dense strand in the vitreous, due to hemorrhage. A central depression in this mass may have been a sign of avulsion of the optic nerve.

MAYWEG (411, **Tetanus following injury of the globe**) saw a case of laceration of the globe with a saw. After eight days oculomotor and facial paralysis developed, and was

followed in a few days by death in spite of serum therapy. Tetanus infection had spread from a bit of wood which had lodged deep in the orbit and was imbedded in pus. After symptoms of tetanus become manifest, serotherapy is too late. If applied early enough, no operative removal of the purulent focus is required.

Pincus's (412, **Spontaneous recovery from traumatic pulsating exophthalmos**) patient had a fall and fractured the base of his skull, at the apex of the right orbit. The optic nerve was torn, and there was temporary paralysis of oculomotor and facial. On the left side there was an injury of the auditory canal and rupture of the drum membrane. Some months later, pulsating exophthalmos developed on the left side, with marked swelling of the veins, causing compression and paralysis of the abducens. An arterio-venous aneurysm had been formed by rupture of the internal carotid in the cavernous sinus. Constant compression led to final disappearance of the exophthalmos. The distressing subjective noises disappeared of their own accord after ten years. The cure of the exophthalmos was probably due to a thrombus. Operative treatment was omitted as each compression of the carotid caused weakness of the left side and some aphasic symptoms.

Ohm (413, **Unilateral reflex pupillary paralysis due to orbital injury**) reports a case of unilateral involvement, in which the convergence-accommodation reaction was preserved. There was probably an injury of the short ciliary nerves which run from the ciliary ganglion and contain branches from the oculomotor, trigeminal, and sympathetic, and, at all events, an orbital injury. This case disproves Moebius's assertion that unilateral reflex pupillary paralysis with preservation of convergence reaction must be due to a lesion in the cerebrum.

Zimmerman (414, **Bullet wound of orbit**) reports a case in which the bullet was imbedded in the orbit near the optic foramen. Meningitic symptoms made an operation necessary. By means of Kroenlein's osteoplastic resection of the outer orbital wall, the bullet was exposed and removed. Uneventful recovery. Final V = $\frac{5}{10}$.

Papaivannon (415, **Echinococcus of optic nerve**) has seen hydatid cysts in various cavities. In this case one developed

in the sheath of the optic nerve and grew rapidly, appearing as a sarcoma with rapid progress, until it finally burst. The unusual spread of hydatids in Greece is due to the personal habits of the pastoral population.

Salzer (416, **Histological study of worm-cataract of fishes**) examined the eyes of seven trout from a Danish hatchery for trematodes, which Greeff had found in 1905 in the lenses of fishes and aquatic birds. Salzer found that the trematodes only remain in the eye for a short time, and by their excretory products cause a degeneration of the lens substance, after which they become encapsulated in lens epithelium. Later on, the cornea becomes macerated. The worms spread through the general circulation. The author is now engaged in feeding experiments on birds to determine the details of propagation and communicability. He advises examining all cases of Morgagnian, chalky, and complicated cataract for trematode worms.

Thomson and Buchanan (417, **Nine cases of injury to the eyes of the child during labor**) publish some more cases which have come under their notice in which the eye has been injured during labor. The first cases of the series were published in the *Ophthalmoscope* for June, 1905.

Case 1.—Two bands across middle of cornea, then general corneal opacity. On second day some proptosis, cornea oval horizontally. Later the cornea ulcerated, but healed, leaving a leucoma. Forceps case.

Case 2.—Corneal opacity; prolonged labor, Milne-Murray axis. Traction forceps; child died.

Case 3.—Corneal opacity—did well; forceps.

Case 4.—Right eye lying on cheek at birth; difficult labor; forceps. The eyeball was expressed by compression and not evulsed by the forceps. Evulsion is impossible with intact eyelids.

Case 5.—Aged nine. A high degree of astigmatism on one side only. Meridians: $V = -5$; $H = -13$. The eye showed signs of having been bruised at birth, of which there was also evidence from the mother.

Case 6.—A vertical band of opacity on the posterior surface of the cornea, caused by forceps.

Case 7.—High astigmatism. Hair-like lines on the posterior surface of cornea. Forceps delivery.

Case 8.—Convergent strabismus and nystagmus from birth. The face was swollen and black from the forceps. Probably rupture of the orbit.

Case 9.—Prolonged labor, no forceps. Eyes turned up and to left, never turned to right. Slow jerky nystagmus. Child's eyes did not follow an object. Later on contraction of arms and clenching of hands. A cerebral hemorrhage at birth suggested as the cause of the condition. When last seen there was no improvement.

The authors make no comment on the cases, which are part of a series. See also *Trans. Ophth. Soc.*, vol. xxiii., 1903.

T. Harrison Butler.

XXII.—OCULAR AFFECTIONS IN GENERAL DISEASES.

418. Gutmann, A. **External diseases of the eye and nasal affections.** *Deutsche med. Wochenschrift*, 1907, Nos. 20–22.

419. Laas, A. **Crossed visual disturbance after operations on the septum.** *Zeitschrift f. Augenheilk.*, xviii., p. 142.

420. Seggel, K. **Blindness after phlegmonous tonsillitis by way of cerebral thrombo-sinusitis.** *Klin. Monatsbl. f. Augenheilk.*, xlv., No. 2, p. 129.

421. Wirsing. **Lead poisoning and eye disease.** *Deutsche med. Wochenschrift*, 1907, p. 1855.

422. Stoewer, W. **Treatment of septic thrombosis of cavernous sinus of orbital origin.** *Klin. Monatsbl. f. Augenheilk.*, xlv., No. 2, p. 147.

423. Krauss, W. **Ocular changes in cranial deformity, peaked skull, etc.** *Zeitschrift f. Augenheilk.*, xvii., p. 356.

424. Narich. **Pupillary inequality an early sign of tuberculosis.** *Rev. méd. de la Suisse Romande*, Dec., 1906.

425. Napp, O. **Mikulicz's disease and tuberculosis.** *Zetschrift f. Augenheilk.*, xvii., p. 513.

426. Stock, W. **Tuberculosis as a cause of chronic uveitis.** *Graefe's Arch.*, xlvi., p. 1.

427. Gourfein-Welt, L. **Ocular lesions in spontaneous myxœdema of adults.** *Arch. d'opht.*, xxvii., p. 561.

428. Lauber, H. **Case of scar fixation of the globe after syphilitic necrosis of nasal wall of orbit.** *Zeitschrift f. Augenheilk.*, xviii., p. 41.

429. Stocke. **Dysthyroid ocular symptom-complex.** *Soc. Belge d'opht.*, April, 28, 1907.

430. de Lapersonne et Cerise. **Brain tumor. Death sixty hours after lumbar puncture.** *Soc. de Neurol. de Paris*, May 2, 1907.

431. Kinczyc, C., and Kuess. **Intracranial metastasis of gastric**

cancer with compression of oculomotor nerve. *Annales d'oculistique*, cxxxviii., p. 174.

432. Casali, A. **Metastatic ophthalmia due to the hemophile bacillus of Pfeiffer.** *Ann. di Ottalm.*, xxxvi., Nos. 1–2, p. 216.

433. Bertozzi. **Metastatic ophthalmia due to fusiform bacillus of Vincent.** *Ibid.*, Nos. 3–4, p. 235.

434. Bertozzi, A. **Scintillating scotoma.** *Ann. di Ottalm.*, xxxvi., Nos. 3–4, p. 235.

435. Delneuville. **Nasal affections complicated by eye disease.** *Soc. Belge d'opht.*, April 28, 1907.

436. Hancock, W. L., and Mayon. **Tuberculin injections in ocular tuberculosis.** *Ophthalmoscope*, July, 1907.

437. Woodward, J. H. **Ocular complications of mumps.** *Ann. of Ophth.*, Jan., 1907.

438. Krall, J. T. **Severe ocular pain associated with grippe.** *N. Y. Med. Journ.*, April 27, 1907.

439. Heath, C. W. **Hysteria with simulation of ocular injury.** *The Ophthal. Record*, April, 1907.

440. Posey, W. C. **Unusual ocular manifestations of gonorrhœa.** *Ann. of Ophth.*, Jan., 1907.

441. Ballantyne, A. J. **Ocular symptoms of cerebro-spinal meningitis.** *Brit. Med. Journ.*, July, 1907.

Gutmann (418, **External diseases of the eye and nasal affections**) discusses, at first, the relations of conjunctivitis to the lachrymal passages; then the reflex vasomotor affections emanating from the nose, the bacterial flora of the nasal mucosa, the relation of nasal to conjunctival and corneal eczema, and the clinical significance of hypertrophied tonsils. Lupus and pemphigus of the conjunctiva are also considered in their relation to diseases of the nose.

Laas (419, **Crossed visual disturbance after operations on the septum**) thinks that operations on the septum may be dangerous for the eye. The loss of visual field was probably due to a fracture of the bony wall of the optic canal, which was probably very thin in the neighborhood of the ethmoid cells. In another case there was probably extension of a fracture of the wall of one of the accessory cavities into the optic canal. A tear of the periosteum is very apt to extend into the meninges. Meningitic symptoms may then develop if virulent germs have access to the bone fracture.

Seggel (420, **Blindness after phlegmonous tonsillitis by way of cerebral thrombo-sinusitis**) noted marked exophthalmos followed by optic atrophy, with loss of vision, except in a

small remnant of the field. The right internal jugular could be felt as a hard cord. The thrombus, which probably caused the symptoms, did not lead to death, probably because it existed for some time and was then not favorable to infection and septic absorption. The treatment consisted in inunctions, massage of the jugular, iodides, and injections of strychnin.

WIRSING (421, **Lead poisoning and eye disease**) reports a case of acute poisoning due to red lead, probably taken to induce abortion, with menstrual disturbances, saturnine encephalitis, evanescent paralysis of the left superior oblique, and double optic neuritis leading to atrophy of the left nerve.

STOEWER (422, **Treatment of septic thrombosis of cavernous sinus of orbital origin**) reports three cases originating in affections of the nose or skin, all ending fatally Orbital abscess should always be excluded by puncture and if necessary Kroenlein's operation should be performed to expose the depths of the orbit and to get at the superior orbital vein, which is to be aspirated to drain off the pus directly.

KRAUSS (423, **Ocular changes in cranial deformity, peaked skull, etc.**) thinks there is no radical difference between eye affections in peaked skull and those due to rachitic craniotabes or other deformities. Exophthalmos, optic-nerve atrophy, and all the other typical ocular lesions are due to one and the same cause, the misproportion between the rigid capsule of the skull and its growing contents. The result is a spreading of the orbits and base of the skull. Hydrocephalus, with synostosis of the sutures and delayed ossification at the base, may be the result.

NARICH (424, **Pupillary inequality an early sign of tuberculosis**) observed four cases in which pupillary inequality was present in incipient phthisis pulmonum, and believes that it is of diagnostic significance. BERGER.

NAPP (425, **Mikulicz's disease and tuberculosis**) reports a case with peculiar formation of nodules in the conjunctiva of the lids and globe. Microscopic examination showed tubercle bacilli, supporting the views as to the etiology of this disease advanced by Meller, Fleischer, and Osler.

STOCK (426, **Tuberculosis as a cause of chronic uveitis**) injected pure cultures of tubercle into the circulation of rabbits and produced iritis with nodules, cyclitis, and dis-

seminate choroiditis. The histological picture was not characteristic of tuberculosis, although tubercle bacilli were found. Scleritis, keratitis, and growths like chalazion were also produced. Implantation of tissue, excised in iris tuberculosis, into the anterior chamber of rabbits was invariably negative. Tuberculin reaction (O. T.) is advised for diagnostic purposes. There may be a marked local reaction or a general reaction with small gray nodules in the small circle of the iris, which are hardly visible except with a binocular loupe. In some cases reaction ocurs in latent tuberculosis.

Gourfein-Welt (427, **Ocular lesions in spontaneous myxœdema of adults**) saw two cases of myxœdema in adults following atrophy of the thyroid associated with optic atrophy and temporal or bitemporal hemianopsia. In one case the symptoms of acromegaly were present. The latter is ascribed to compensatory hypertrophy of the hypophysis cerebri following the atrophy of the thyroid, with pressure on the optic nerves. Berger.

Lauber (428, **Case of scar fixation of the globe after syphilitic necrosis of nasal wall of orbit**) reports a case of gummatous periostitis of the lachrymal and ethmoidal bones with partial necrosis and involvement of the orbital contents on the nasal side. Cicatricial contraction in this region, later on, led to traction on the lids and epicanthus, and limitation of motility outward simulating convergent squint. The motions of the globe took place around a vertical axis which was about at the nasal tangent of the equator. Dibbel's case is the only other one on record of a disturbance of motility of this sort which was acquired, not congenital.

Stocké (429, **Dysthyroid ocular symptom-complex**) saw five patients of twenty to twenty-five years of age with symptoms of myxœdema and gastro-intestinal disturbances (constipation, hyperchlorhydria) in whom there developed a conjunctivitis with scanty secretion but marked chemosis and a feeling of dryness in the eyes. The disks were red and swollen. Suitable treatment and the administration of iodides led to a cure. The etiological factor was probably an insufficiency of the thyroid. Treatment with thyroidin was not tried.

de Lapersonne and Cerise (430, **Brain tumor. Death**

sixty hours after lumbar puncture) showed histological specimens of a case of right frontal lobe tumor with choked disk. Lumbar puncture was followed by intense headache, slowing of the pulse, irregular respiration, and final syncope, in which the patient died sixty hours later. BERGER.

KINCZYC and KUESS (431, **Intracranial metastasis of gastric cancer with compression of oculomotor nerve**) observed a secondary involvement of the right cavernous sinus with oculomotor paralysis. These cases are very rare, but probably all on record as carcinoma of the brain are metastases from the viscera. BERGER.

CASALI (432, **Metastatic ophthalmia due to the hemophile bacillus of Pfeiffer**) reports the case of a young girl of seven. Six days after an attack of influenza, metastatic ophthalmia developed in one eye with œdema of the lids, chemosis, exophthalmos, clouding of the cornea and aqueous, and cyclitic exudate, leading to atrophy of the globe. Bacteriological examination and cultures showed a minute germ, frequently diplo-bacillary in form, similar to Pfeiffer's bacillus, and which is, genetically, hemophile. The exophthalmos was due to cellulitis of the orbit and of Tenon's capsule. As enucleation was not performed, a stump remained which was very satisfactory æsthetically and not at all tender or painful. CALDERARO.

BERTOZZI (433, **Metastatic ophthalmia due to fusiform bacillus of Vincent**) saw a child, nine months of age, with measles, after which a purulent metastatic ophthalmia developed. Exenteration of the globe evacuated thick, glairy, yellowish-green pus and resulted in a cure. Bacteriological examination showed the fusiform bacillus of Vincent generally associated with angina. As Pfeiffer's hemophile bacillus was not found, the author concludes that measles affects the buccal cavity and that the specific germ entered the general circulation from the mucosa of the mouth and thus reached the interior of the eye. CALDERARO.

BERTOZZI (434, **Scintillating scotoma**) claims that ophthalmic migraine or transitory amblyopia is due, in its binocular, paracentral, or hemianopic form, to vascular spasm or paralysis in the occipital lobe, cortical visual areas, or somewhere along the visual tract up to the chiasm, while

the binocular total central form and the monocular variety are due to vasomotor disturbances in the retina or optic nerve. Over-exertion, particularly mental strain, is the most potent occasioning cause. Several members of a family may be attacked. CALDERARO.

DELNEUVILLE (435, **Nasal affections complicated by eye disease**) reports the following cases: Double retrobulbar neuritis. V, O D = F. at 1*m;* V, O S = $\frac{5}{10}$. Vision rose to normal after the nasal affection, probably a sphenoidal sinusitis, was cured. The second case was one of ethmoidal sinusitis following influenza in a patient of seventy-five years. Intense headache, diplopia, and double optic neuritis with diminution of vision to $\frac{1}{2}$ were the striking features. Inunctions led to recovery with normal vision. BERGER.

HANCOCK and MAYON (436, **Tuberculin injections in ocular tuberculosis**) began with injections of not more than $\frac{1}{1000}$ of a *mg* having regard to the negative phase which usually lasts about two weeks, during which the ocular disease tends to get worse. The opsonic index must be carefully watched, as often the first two injections cause no local reaction. When the index rises the dose may be increased. The larger dose causes ciliary injection, corneal haze, and more keratitis punctata. After this the index reaches its highest point and improvement commences. The injection should be repeated on the eighth day, as the negative phase is not so great if tuberculin be given while the index is rising. The results obtained were, the authors think, considerably better than those obtained by the older methods of treatment. Probably had the injections been combined with the open-air treatment still more encouraging results would have been obtained. The cases were, four of conglomerate tuberculous iritis, one of miliary tubercle of the iris, and four of tuberculous scleritis. All the five patients with iritis had gone through a prolonged course of antisyphilitic treatment and had not improved. T. HARRISON BUTLER.

In reviewing the literature WOODWARD (437, **Ocular complications of mumps**) finds that no structure of the eye or its adnexa is free from liability to affection. The most common affections are optic neuritis and conjunctivitis. He adds the description of one case of neuro-retinitis. BLAKE.

That severe ocular pains may be unassociated with any objective signs of any portion of the eye is demonstrated by KRALL's (438, **Severe ocular pain associated with grippe**) four cases of influenza. He regards the condition as being a neuralgia of the ciliary nerves, due to the circulation of toxins in the blood. BLAKE.

Forty-two pieces of broken lens glass were removed from the conjunctival sac of HEATH's (439, **Hysteria with simulation of ocular injury**) patient, at intervals during four days. The girl presented the typical symptoms of hysteria.

BLAKE.

Subsequent to a specific urethritis, POSEY (440, **Unusual ocular manifestations of gonorrhœa**) describes a chain of ocular diseases. First there appeared a conjunctivitis, with abundant gonococci in the secretion. The organisms were also found in the pus from a sphenoidal sinusitis. Following this a punctate keratitis appeared in each eye. Later iritis and then irido-cyclitis developed. The writer also describes another case with metastatic conjunctivitis and punctate keratitis. Colon bacilli were found in pure culture.

BLAKE.

BALLANTYNE (441, **Ocular symptoms in cerebro-spinal meningitis**) has investigated the ocular symptoms in 73 cases of cerebro-spinal meningitis at the Glasgow Fever Hospital. He classifies his results as follows: *Eyelids*—an eruption of herpes was noticed on both lids of one eye during the first week of an acute case. Retraction of the eyelids was noticed in 15 cases. It was observed on the fourth day, but was more marked during the chronic stage. In one case a typical Von Graefe's sign was noticed. In twelve patients retraction was associated with mydriasis and abolition of the light reflex. In one case the pupils were small and inactive. In 2 cases retraction was associated with abolition of the cilio-spinal reflex. Retraction generally disappeared during sleep. The cause is obscure. Retraction is a constant sign of chronic hydrocephalus. Blepharospasm. This sign was very frequent, being a part of the general hyperæsthesia. *Conjunctiva*—Hyperæmia was frequent and an acute catarrhal or muco-purulent conjunctivitis was noticed in 13 cases. The meningococcus was not found in the discharge.

In 4 cases a conjunctival hemorrhage was noticed, no cutaneous hemorrhage being present. A *corneal* ulcer was present in one case. The corneal reflex was generally normal. The *uveal tract* was never affected. *Pupils*—In 18 cases the pupils were unequal. In 34 cases the pupils were dilated; in 5, contracted. Hippus was present in 31 cases, absent in 19 cases. The hippus has a greater amplitude than normal. The light reflex was normal in 24 cases, deficient in 26, absent in 7, variable in 11. *Strabismus* was present in 23 cases, but in only one case was it a paralytic squint. *Nystagmus* was present in 7 cases, conjugate deviation in 4 cases. Conjugate movements normal in 41 cases. *Vision*—This as tested with small objects was good in 34 cases, defective in 12, and absent in 9. The visual defect was seldom due to gross ocular lesions, but the cause was probably in the higher centres. Optic neuritis accounted for three cases. Double optic neuritis was found in 5 cases, and in 9 the disk margins were blurred. As regards diagnosis the chief ocular feature is the great variation of the signs, squint, retraction of the lids, pupil changes, etc., in the same patient from day to day, or in one day. Comparing the disease with tubercular meningitis, the infrequency of the paralytic squint and optic neuritis and the frequency of spasmodic squints and dissociated movements are somewhat striking.

Ballantyne thinks that retraction of the lids, corneal complications, absence of pupil reflexes, true nystagmus, and optic neuritis are symptoms of ill omen as regards prognosis.

T. Harrison Butler.

BOOK REVIEWS.

XXIII.—**The Pathology of the Eye.** By J. Herbert Parsons (London). Vol. IV. General Pathology, Part II. New York: G. P. Putnam's Sons. 1908. Price, $3.50.

This volume concludes Mr. Parsons's *Pathology of the Eye.* It treats of the injuries of the eye, exophthalmos and enophthalmos, panophthalmitis, orbital cellulitis, and thrombosis; thrombosis of the cavernous sinus, sympathetic ophthalmia, symptomatic diseases of the eye, and heredity. It will be observed that many of the subjects are treated rather from the clinical than from the purely pathological standpoint; thus the work assumes a broader scope and its value is increased. The words of praise with which the individual volumes were received can now be repeated on the appearance of the entire work. It will remain a lasting monument to Mr. Parsons's industry and to English Ophthalmology.

A. K.

XXIV.—**Ophthalmic Surgery.** By Dr. Joseph Meller, 1st Assistant at Professor Fuchs's Eye Clinic in Vienna. Translation reviewed by Dr. W. L. Pyle of Philadelphia. 262 pages. 118 illustrations. Published by P. Blakiston's Son & Co., 1012 Walnut St., Philadelphia. 1908. Price $3.00 net.

This book on operations on the eye is characterized by several important features. It is first of all not exhaustive, only the methods of operating are described which have stood the test of time and are in use in one of the largest Continental eye clinics. The student will therefore not be dumbfounded by an endless array of operative procedures. The description of the operations is complete, clear, and shows the practised hand of a teacher. The illustrations are excellent and of course add enormously to the value of the descriptions. The

list of operations is fairly complete; operations on the frontal sinus and Krönlein's osteoplastic resection are not mentioned, and perhaps space out of proportion to their importance or difficulty of execution is given to the extirpation of the lachrymal sac and iridodialysis. A. K.

XXV.—**The Ophthalmic Year Book.** Vol. V. By E. Jackson, G. E. de Schweinitz, and T. B. Schneideman. Illustrated. The Herrick Book and Stationery Company, Denver, Colo. 1908. Price, $2.00.

The fifth volume of the *Ophthalmic Year Book* contains a digest of the literature of ophthalmology with index of publications for the year 1907. Sympathetic disease, glaucoma, and toxic amblyopias are by Dr. de Schweinitz; the biographical sketches, refraction, disorder of the ocular movements, lachrymal apparatus, diseases of the lids, orbit, and injuries are by Dr. Schneideman; and the remainder is from the pen of Dr. Jackson. The many excellent features of this Year Book make it practically indispensable.

A. K.

XXVI.—**Maladies de l'Œil** (Diseases of the Eye). By Albert Terson, Paris. 1 vol., 400 pp., 142 figures. Published by J. B. Baillière et fils, 19 rue Hautefeuille, Paris. 1908. Price, 9.50 francs.

This volume, a part of the *Nouveau Traité de Chirurgie* by Le Dentu and Delbet, aims to give the essentials of ophthalmology, in other words what the general practitioner should know of the diagnosis and treatment of eye-diseases. After a brief introduction on the methods of the examination, the more usual affections of each part of the eye from the eyelids to the optic nerve are taken up with the necessary reference to the pathology, diagnosis, and treatment. Practically all operations are described. The author was for many years associated with Panas in the Hôtel-Dieu and is a well-known contributor to ophthalmological literature.

A. K.

XXVII.—**The Development of Ophthalmology in America, 1800–1870.** By A. A. Hubbell of Buffalo. W. T. Keener & Company, Chicago, 1908. Price, $1.75.

Dr. Hubbell's address on American Ophthalmology before the Section on Ophthalmology, A. M. A., June 4, 1907, now appears in book form revised, enlarged, and illustrated by portraits and cuts. The book begins with a sketch of special eye hospitals and of the general practitioners who devoted some of their time to eye-work. The development of Ophthalmology then advanced to the stage when specialists appeared on the field. A description of the pioneer specialists then follows, with a list of their contributions to Ophthalmology. The book is designed to give the growth of Ophthalmology from 1800 to 1870; it will prove of interest to all workers in this field.

A. K.

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